



Option Manual

A-series Vision Tool

Document	Option Manual A-series Vision Tool
Based on	-
Order number	4022 593 50832
Supplied with:	PA 1866/00

MANUAL HISTORY					
ISSUE	DATE	ORDER NUMBER	REVISION CODE	STATUS	RELEASE DOCUMENT
First Issue	October 2006	4022 593 50831	06.01	Replaced	DI-AQ/D9-023
Second issue	January 2008	4022 593 50832	08.02	Current	DI-A-series-015

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CHAPTER 1 Introduction

With this kit component vision files can be created off-line, both for AQ-2 and AX-201 machines as well.

1.1 Contents of the kit

Item	Quantity
Dell PC XP operating system	1
Monitor	1
Keyboard	1
Mouse	1
24V power supply (including cables)	1
CV LFOV camera	1
Z-Rz unit	1
Set of AQ-toolbits	1 x O1, 1 x O3
Recovery disk AQ-2	1
Recovery disk AX-201	1

Figure 1 Contents of the kit

1.2 Connection diagram

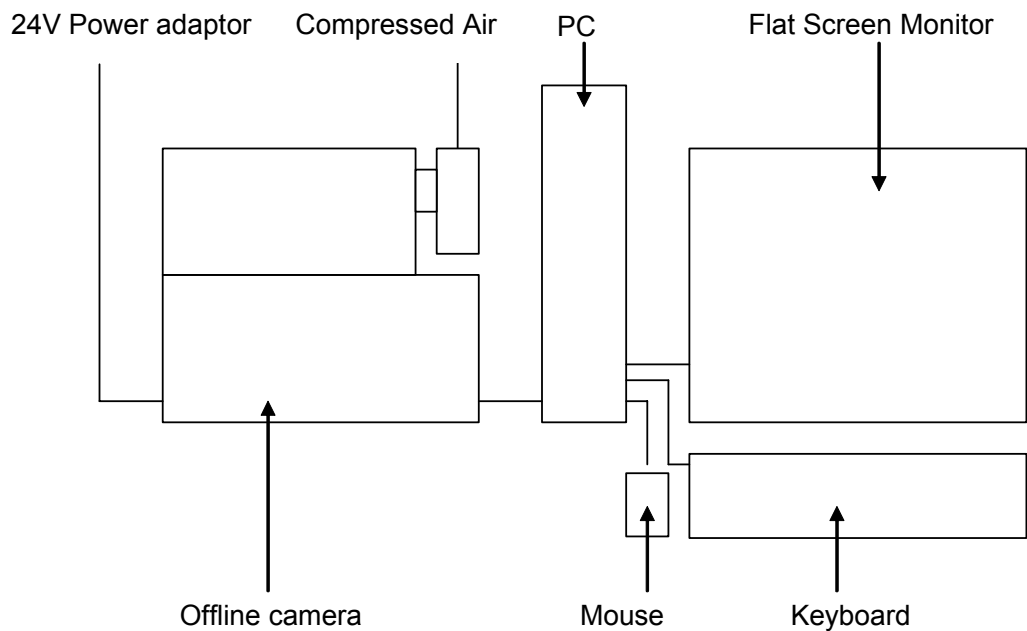


Figure 2 Connection diagram

CHAPTER 2 Hardware installation

1. Preparation

- Make sure you have a location available with a 230 VAC power outlet to connect the computer and the 24V power supply for the camera unit.
- Compressed air must be available to connect to the camera unit. Pressure must be between 500 and 800 kPa.

2. Unpacking

- Open the crate and carefully remove all items inside. Check that all necessary parts are present. See [1.1 Contents of the kit](#) for the contents of the kit.



Transport crate

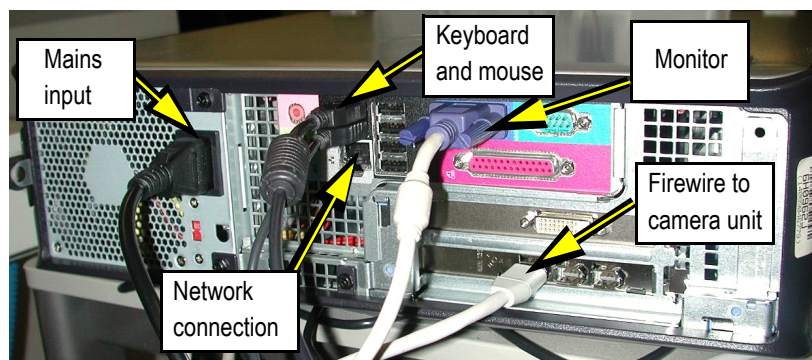


Contents of crate

3. Installation instruction

Follow the following steps to connect all parts of the A-series vision tool:

- Connect the mains, monitor, keyboard, mouse and firewire cable to the PC. Optionally the PC can be connected to an existing network. Contact your local ICT department for support.

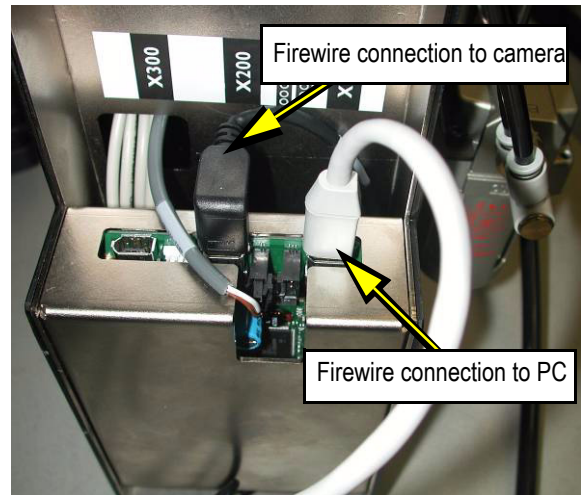


PC peripheral Connections

Hardware.fm

- Connect the PC to the camera unit, as indicated in the figure, using the supplied Firewire cable.

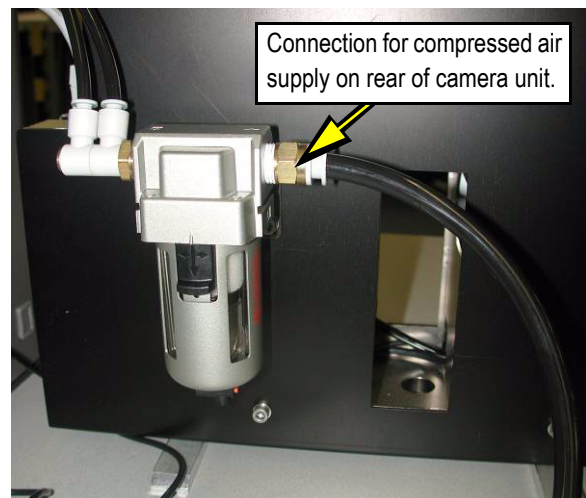
Note: The connections on the camera unit must be made exactly as indicated in the figure, otherwise the system will not work.



Firewire connection on camera unit (side view)

- Connect the camera unit to the compressed air supply. An 8 mm tube must be used to connect to the supplied connector. Alternatively you can replace the connector with your own to fit your existing tube.

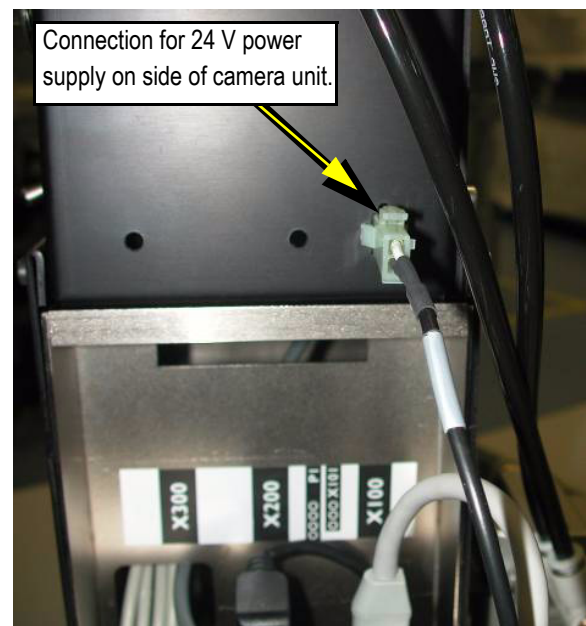
Note: Pressure must be between 500 and 800 kPa.



Connecting the compressed air supply (rear view)

- Connect the 24V Power adaptor to the camera unit and to a 230 VAC Power outlet
- Connect the PC to an available 230 VAC Power outlet.

The setup of the hardware is now complete.



Connecting the 24V power (side view)

CHAPTER 3 Software installation

Two recovery disks (AQ-2 and AX-201) are supplied with the A-series vision tool. Install the concerning disk for corresponding vision files. It can also be used in case the software is not functioning correctly. After installation the system will be restored to the original factory settings.



NOTE: After installing the recovery disk all component vision files stored on the system will be lost. Create a backup of these files if necessary. Follow these steps to install the recovery disk:

- If applicable archive all component vision files
See [4.6.10 Vision data, archiving](#) for archiving AQ-2 or [4.5.2 Component vision files, archiving](#) for archiving AX-201 vision files.
- Insert the recovery disk in the DVD drive.
- Shut down the system and reboot. The system will boot from the recovery disk.
- You will see the following prompt: 'WARNING: All data in partition (....) on HD0 will be lost. Are you sure you want to continue with the restore (Y/N)'. Answer with 'Y' and press <Enter> to continue with the installation.
- As soon as the message 'The process has completed successfully' appears the installation is finished successfully.
- Press <Enter> and remove the recovery disk from the drive.
- Press <Enter> to restart the controller.
- If applicable restore the backup of component vision files.
See [4.6.9 Vision data, restoring](#) for restoring AQ-2 or [4.5.3 Component vision files, restoring](#) for restoring AX-201 vision files.

CHAPTER 4 User instructions

4.1 Preparation

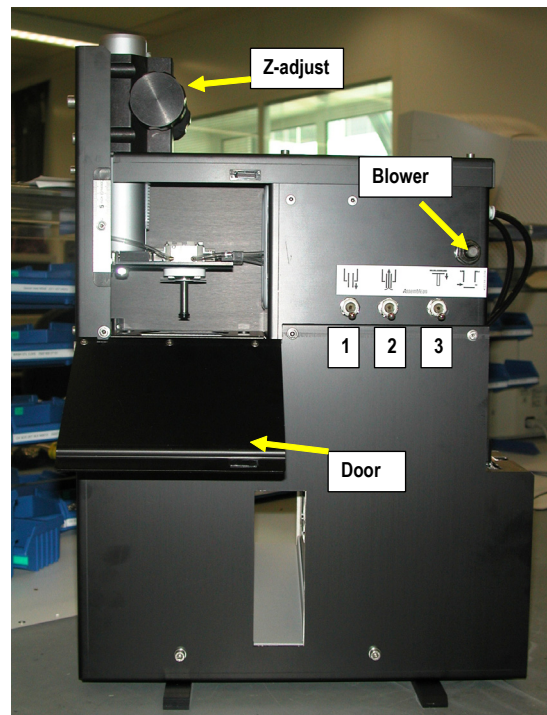
This section describes the steps to take to prepare for component measurement. Follow the steps below:

- Switch on the PC
- Logon with username “user” and password “user”. The system will startup with the following screen.

Note: It is possible to create own user accounts. Contact your local ICT department for assistance.



- Open the main valve of the air supply and plug in the 24 V power supply.
- Double click on the icon “Offline CA Application” on the desktop to start the Offline Vision Application.
- Switch to user level M&S Engineer.
- Open the door on the front of the camera unit and check if the correct toolbit is present for the component to be measured. If necessary the toolbit can be exchanged. See [4.2 Exchange toolbit](#) .
- Raise toolbit manually using the Z-axis adjustment.
- Determine if the component should be held by the inner nozzle or the outer nozzle. This depends on the size and weight of the component.
- If the component should be held by the inner nozzle, the inner nozzle can be lowered by switch 1.
- Measure the height of the component as this is needed to determine the required height of the Z-axis during measurement. If a datasheet is available for the component, the information from this datasheet can also be used.



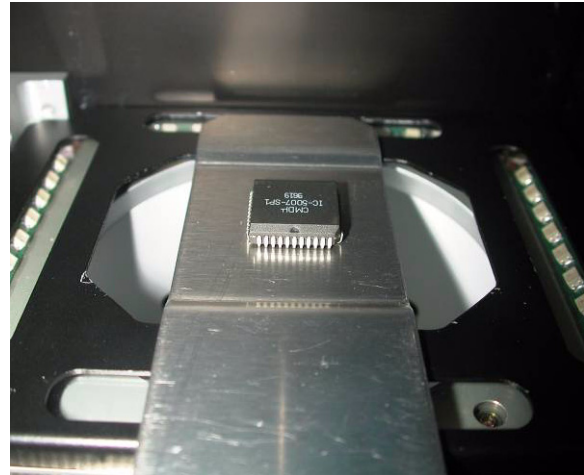
A-series Vision tool

User.fm

- Place component on the component tool as indicated in the figure.

Note: Pay attention to the angle of the component. The angle should be the same as will be used on the machine.

- Lower the Z-axis until the tip of the nozzle is just above the component.
- Switch on the vacuum using switch 2.
- Raise the Z-axis and remove the component tool.
- Lower the Z-axis to the required height. See [4.3 Determine correct measurement height](#) for instructions how to determine the correct height for measurement.
- Continue at [4.6.4 Vision file, measure](#) , to measure the component.

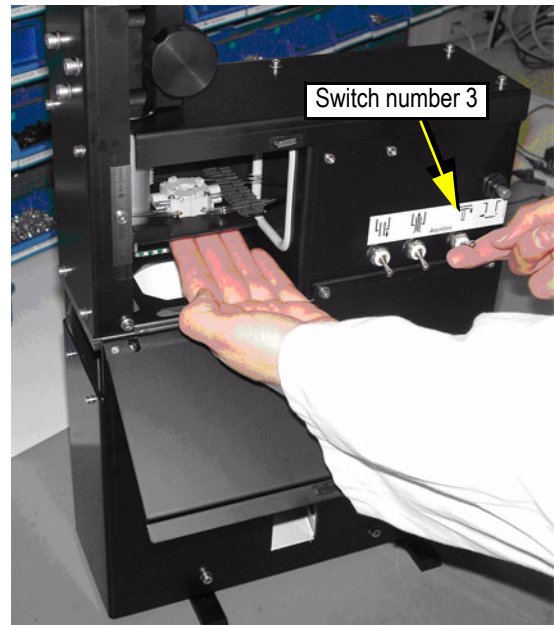


4.2 Exchange toolbit

The A-series vision tool is equipped with a toolbit to hold the component to be measured. Different components may require the use of different toolbits. Follow the steps below to exchange the toolbit.

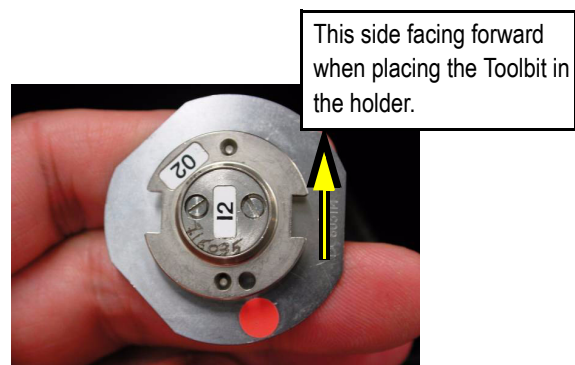
- Manually raise the Toolbit to the maximum Z-height using the Z-axis adjustment.
- Place your hand underneath the Toolbit and release it using switch number 3.

Do not release the Toolbit without placing your hand under it. The toolbit will fall into the camera and may cause damage!



Releasing the toolbit

- Place the new Toolbit under the toolbitholder. Make sure the orientation is correct, otherwise it will not fit. See figure for the correct orientation. When the Toolbit is in position set switch 3 back to the lock position to lock the Toolbit into place.



4.3 Determine correct measurement height

To ensure a correct measurement of the component it must be placed at the height $Z = 0$.

A scale is provided on the Z-axis that must be used to adjust the Z-height to the correct level.

In the figure the scale is shown. Depending on whether the component is placed on the inner or outer nozzle a different part of the gauge must be used.

The $Z = 0$ level for the inner and outer nozzle are indicated in the next two figures.

- The bottom of the component should be placed at $Z = 0$.

There are two ways to achieve this.

1. Measure the height of the component using a caliper (preferred way of working). Measure the height from top to bottom including the leads. Alternatively the component height can be read in the component datasheet if this is available. Adjust the Z-height using the Z-adjust to the height of the component and make sure to use the correct gauge depending on whether the component is held by the inner or the outer nozzle.
2. Use the component tool to determine the correct height.

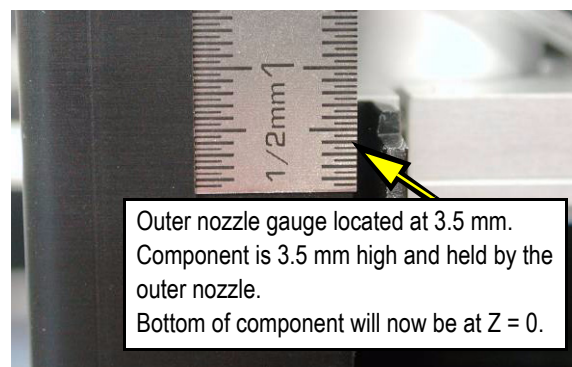
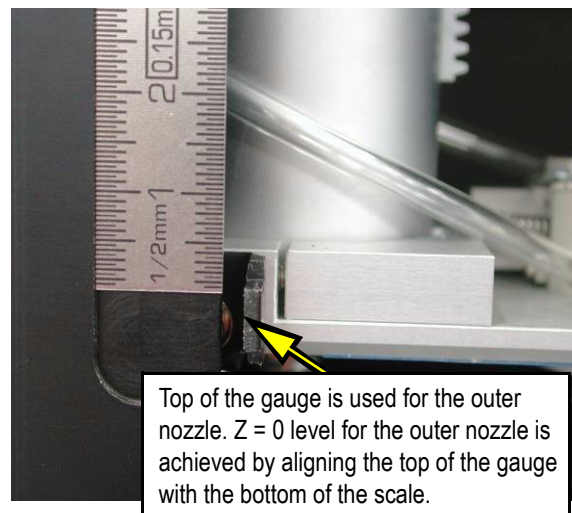
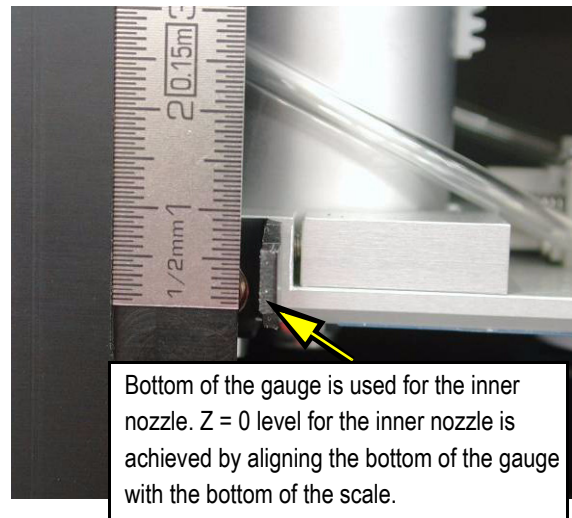
The component tool is constructed in such a way that the bottom of the component will be at $Z = 0$ when placed on the component tool. By placing the component on the component tool and noting the gauge setting when the component is picked up by the nozzle you will be able to re-adjust the gauge to the same height after removing the component tool. The bottom of the component will now be at $Z = 0$.

Note: Danger of squashing component leads by adjustment Z-height too far down.

Example:

The component to be measured is 3.5 mm high and it is held by the outer nozzle.

In this case, you should use the gauge for the outer nozzle and set it to 3.5 mm. Now the bottom of the component will be at exactly $Z = 0$. See figure.



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4.4 Component vision files, break down

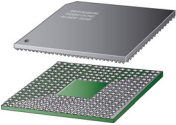
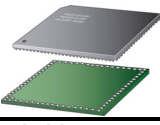
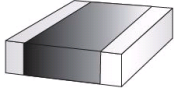

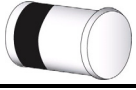
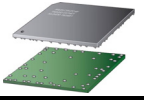
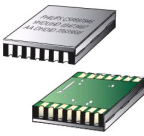



The machine uses component vision files to recognize components. In most cases it will be possible to use a component vision file from a component data base.

Creating a new component vision file can be done in two ways:

- Off line, use A-series Vision tool PA 1866/00
- On line, on the machine.

The way of working off line is similar to working on line, with the exception that the component vision file can not be tested for recognition.

The table below shows different component files and their definitions:

Component	Definition
BGA 	All bumps are in a grid.
CSP Flip chip and BGA 	All bumps are in a grid, one or more rows at each side.
Standard chip 	
Discrete leadless 	Component that can only be defined by "shapes", (rectangles, circles, edges...).
Melf 	Cylinder shape
Flip chip 	All bumps are placed random
Bare die 	Leadless bare die (rectangular)
Other leadless 	
PLCC 	J-leads, 4 sided with equal amounts of leads on all sides
QFP 	Gull wing leads, 4 sided with equal amounts on opposite sides, (sometimes equal on all 4 sides).

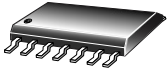


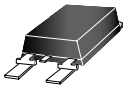

Component	Definition
SO 	Gull wing leads, 2 sided, equal amounts on both sides.
SOJ 	J-leads, 2 sided, equal amounts on both sides.
SOT 	Gull wing leads, 2 sided, different amounts on both sides.
Discrete leaded 	Component with two leads (at the ends), that needs to be aligned using the leads
Other leaded 	Component defined with (multiple) lead groups, and not belongs to any of the other leaded categories.

Figure 3 Component packages and their definitions

4.5 Component vision files for AX-201

Following chapters describe how to:

- Create a new component vision file, see [4.5.1.Component vision file, creating](#)
- Test a component vision file, see [4.5.4.Component vision file, testing](#)
- Correct a component vision file, see [4.5.5.Component vision file, correcting](#)

4.5.1 Component vision file, creating

1. Log on as M&S engineer.

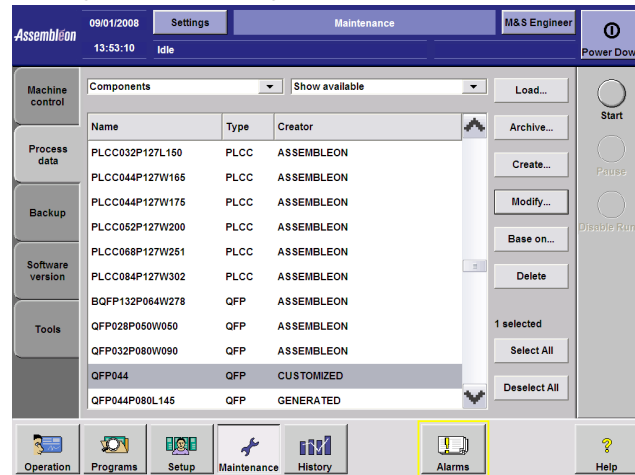


Figure 4

2. Select 'Maintenance' from the menu bar.
3. Select 'Process data'.
4. Select 'Components' from the pull down menu.
5. Select 'Create'.

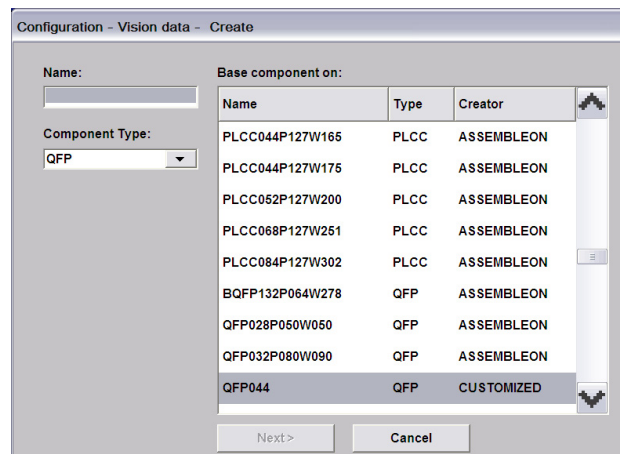


Figure 5

6. Enter a name for the new component.
7. Select the package.

8. Press 'Next'.

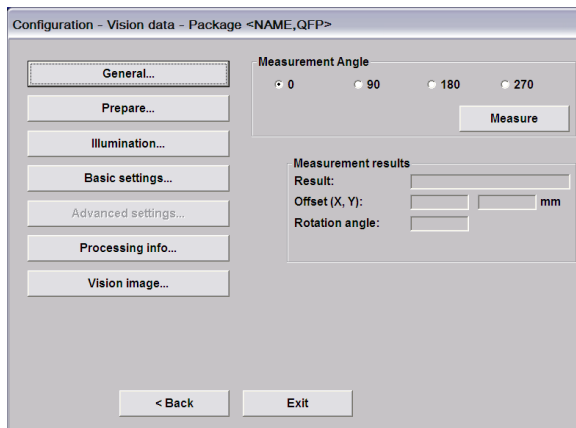


Figure 6

9. Click on 'General' to enter the screen where general package data can be entered.

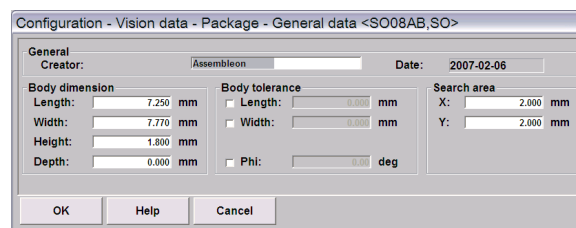


Figure 7

Enter the following data:

- Name of the person who creates the component vision file.
- Body dimensions (package size).
- Body tolerance (package size tolerance).
- Search area (placement tolerance).
- OK.

10. Click on 'Basic settings' to enter the screen where specific component data can be entered. This screen is different for each package type.

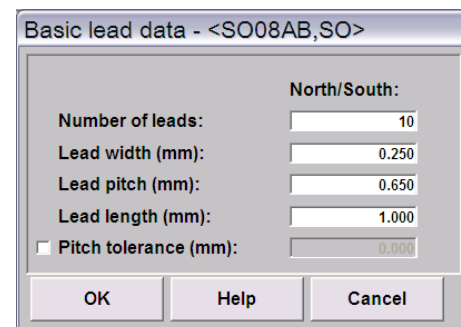


Figure 8

The table below lists the data that can be entered per package type.

Package type	What can be defined in the basic settings window?
CHIP	Nothing
CSP	Bump setting
Bump locations (including missing bumps)	-
FLIPCHIP	Bump setting

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Package type	What can be defined in the basic settings window?
Bump locations (including individual bumps)	-
ODD	Edge locations
Origin	-
PLCC / QFP	Lead data (2 groups: North/South & East/West)
SO / SOJ	Lead data (1 group: North/South)
SOT	Lead data (2 groups: North & South)
SPECIAL	Lead locations
Settings	-

Figure 9

- Select 'OK'.
11. Click on 'Illumination' to enter the screen where illumination data can be entered.

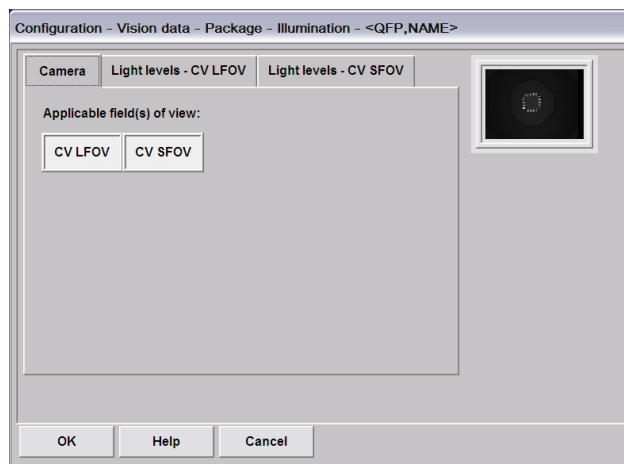


Figure 10

- Select the component alignment camera that must be used to recognize the component.
- Choose the CV LFOV (large field of view camera), the CV SFOV (small field of view camera) or a combination of both.
The light intensity (in percentage) for each light source.

Illumination parameters	
Camera	Indicates which camera is used.
Illumination	Indicates illumination for LFOV (Large Field Of View) or SFOV (Small Field Of View) camera respectively. Choose from: For LFOV or SFOV camera: Dark field of view is used for bumped components. This beam of light creates a shadow and makes the bumps visible for the camera. Bright field of view is used for leaded components. This beam of light creates a reflection on the leads and makes the leads visible for the camera. Back light is used for odd components.
Light level	Defines the light level for the selected illumination type in percentage of maximum light level.
Automatic teach	-

Figure 11

- Set the illumination on the applicable tab page or select 'Teach'.

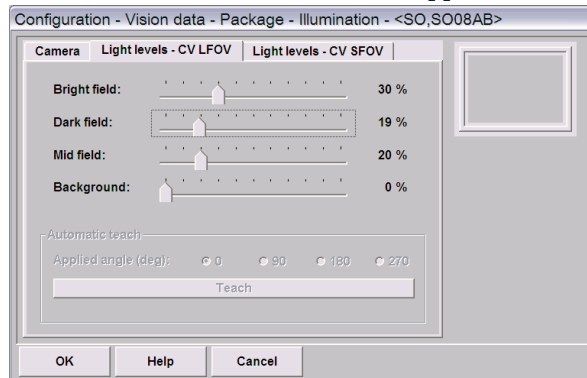


Figure 12

Note: when the component is tested for recognition on the system, it is possible to teach the light levels automatically.

12. Click on 'Processing info' to enter the screen where processing data can be entered.

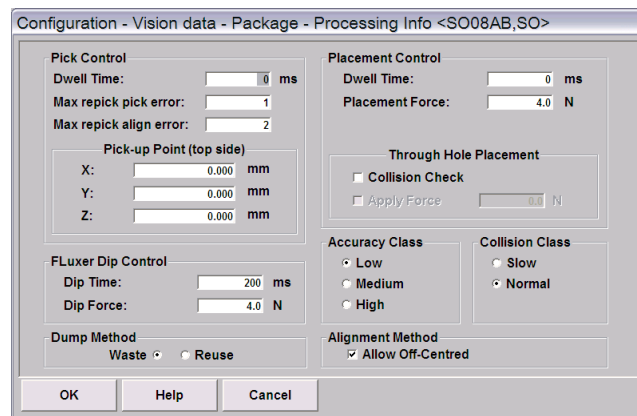


Figure 13

- Enter the following data:
Number of repicks, Fluxer dip control, Placement control, Accuracy class
Collision class, Dump method, Pick-up point.

13. Select 'Vision'.

- Use the live image to check the settings.

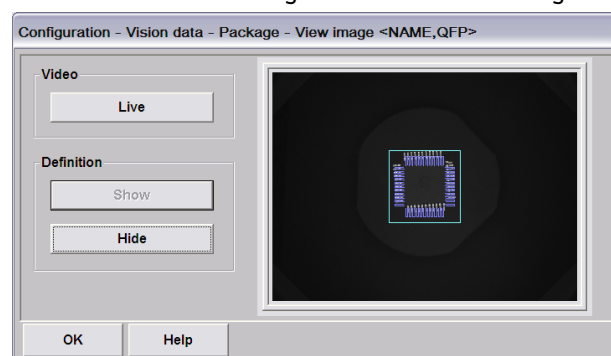


Figure 14

14. Click on Save to save the new component vision file to the controller or an external storage device.

4.5.2 Component vision files, archiving

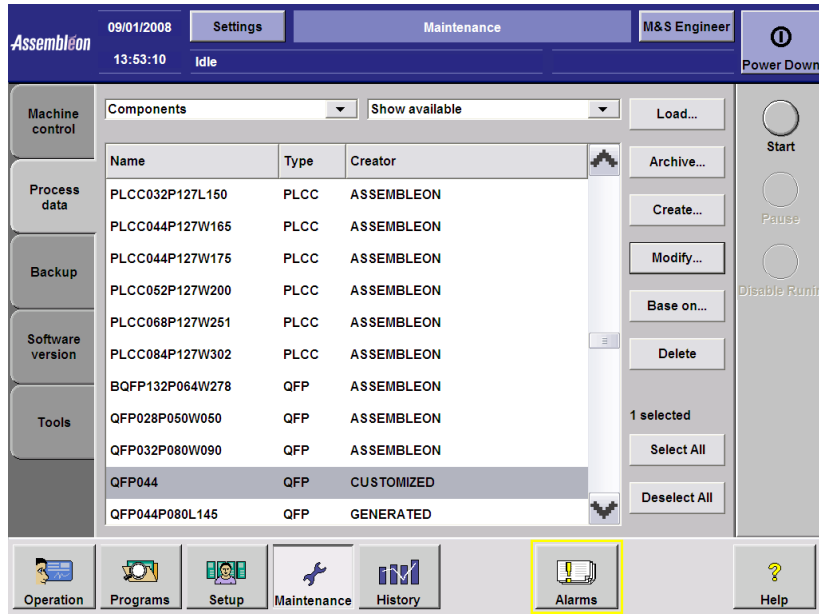


Figure 15 Component vision files, archiving

1. Log on as a M&S engineer.
2. Select 'Maintenance' from the menu bar.
3. Select 'Process data'.
4. Select components.
5. Select concerning component file(s) or 'Select all'.
6. Select 'Archive'.

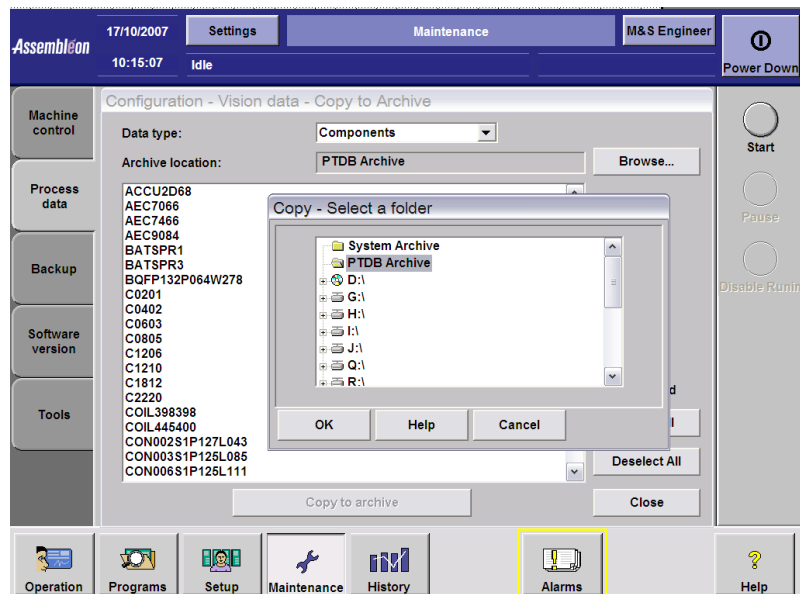


Figure 16 Component vision files, archive location

7. Browse for the desired directory.

4.5.3 Component vision files, restoring

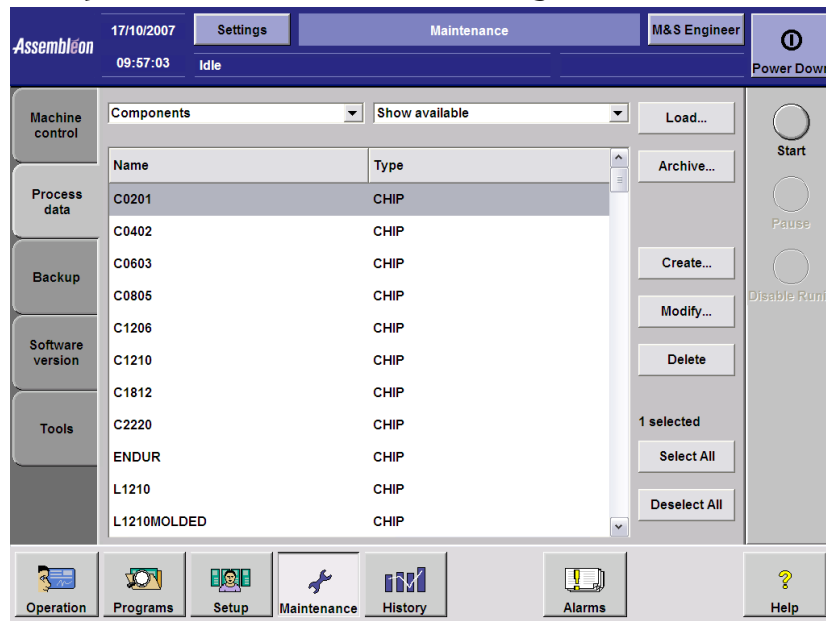


Figure 17 Component vision files, archiving

1. Log on as a M&S engineer.
2. Select 'Maintenance' from the menu bar.
3. Select 'Process data'.
4. Select 'Components'.
5. Select 'Load'.
6. Select 'Archive'.

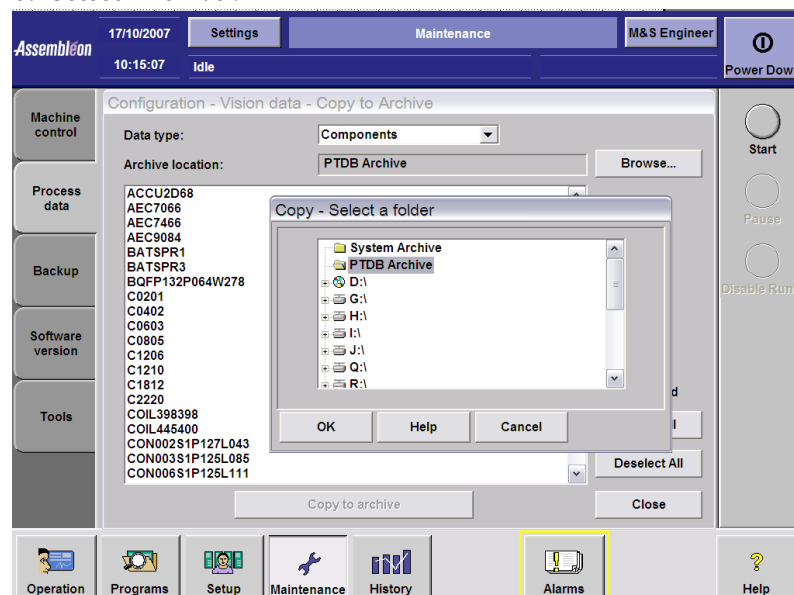


Figure 18 Component vision files, restore location

7. Browse for the desired directory.

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4.5.4 Component vision file, testing

1. Log on as a M&S engineer.
2. Select 'Maintenance' from the menu bar.
3. Select 'Process data'.
4. Select 'Components' from the pull down menu.
5. Select 'Open'.
6. Select the concerning component vision file from the pull down menu.
7. Press 'OK'.
8. Click on 'Prepare' to enter the screen where component transport can be controlled.
9. Select the 'Head' that must be used to pick up the component.
10. Select the 'Nozzle' (inner or outer) that must be used to pick up the component.
11. Click on 'Move to handling side' to bring the head to the side where the component will be placed under the nozzle.
12. Open the protection cover.
13. Click on 'Hold component' to turn on the vacuum on the nozzle
14. Place the component under the nozzle. Try to centre it as good as possible.
15. Click on 'Move to camera' or on 'Move to opposite camera' to bring the component to the camera of your choice.

WARNING: Make sure that you select a camera that is suitable for the component you wish to test. For instance, do not move large components to a small field of view camera.

16. Press 'OK'.
17. Click on 'Vision image'.
18. Select 'Live' to switch on the camera. Use the arrow keys to move the component to the centre.
19. Select 'Show' to show the boundaries of recognition on top of the component image.
20. If necessary make changes to the component vision file to optimize component recognition.
21. Save changes by clicking on 'Save'.

4.5.5 Component vision file, correcting

The list below shows examples of recognition problems for different packages, and possible solutions. When a component is not recognized by the system try one of the solutions mentioned below and test it again as described in [4.5.4.Component vision file, testing](#)

Package type	Problem	Possible solution
All types	Component image is larger than definition / Component is not recognized	Increase the "Body dimensions" and/or "Body tolerance" in "General" screen
All types	Component image is smaller than definition / Size is not optimal	Decrease the "Body dimensions" in "General" screen
All types	Illumination settings not optimal	Press "Auto teach" in the "Illumination" screen
CSP		
FLIPCHIP	Number of bumps not OK	Change number of bumps in the "General" screen
CSP		
FLIPCHIP	Bump pitch not OK	Change bump pitch in the "General" screen
PLCC QFP		
SO		
SOJ		
SOT		
SPECIAL	Number of leads not OK	Change number of leads in the "General" screen
PLCC QFP		
SO		
SOJ		
SOT		
SPECIAL	Lead pitch not OK	Change lead pitch in the "General" screen
ODD	Black/white recognition not OK	Change black/white setting in the "General" screen
ODD	Ruler position not OK	Change ruler position in the "General" screen
ODD	Ruler width not OK	Change ruler width in the "General" screen

Figure 19

4.6 Component vision files for AQ-2

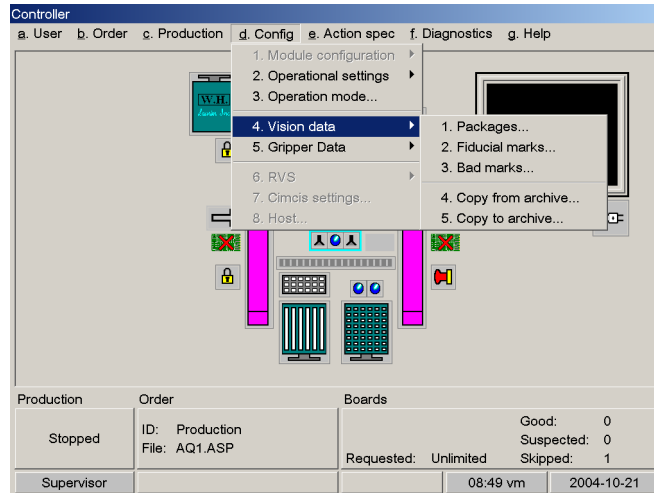


Figure 20 Vision data

With the menu *d. (Configuration) - 4. (Vision Data)*, three types of vision objects can be entered or modified:

- Packages (lead data, vision image etc.).
- Fiducials.
- Bad marks.
- Copy from archive.
- Copy to archive.

With this menu it is possible to select dialogues to load or to store vision data in and out of archives. The three types of vision objects have a common set of manipulation functions, these are:

- Open
- Copy
- New
- Delete
- Save

When the data of a vision object has been changed, a controller warning dialogue is presented. This provides the possibility to accept or discard the changes.

4.6.1 Vision file, creation

- Log in as M&S engineer.

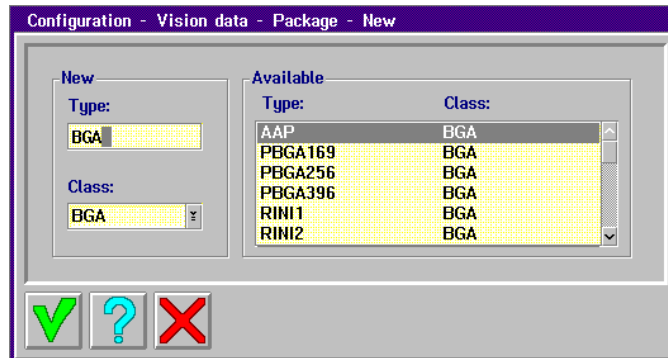



Figure 21 Select a component class and enter a name

- Select a component from the pull-down list.
- Enter a name in the 'Type' box.
- Vision data can also be copied from an existing one in the 'Available' box
- Press .

■ Editing a vision file

For each component the highlighted parameters can be filled in (see Figure 22).

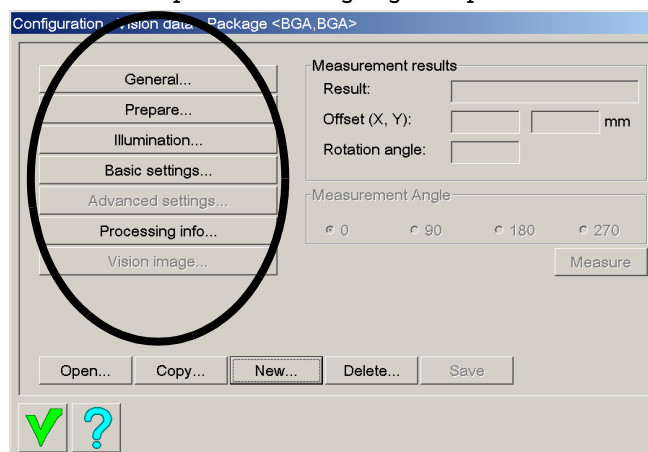


Figure 22 Component, configuration

With this menu it is possible to select dialogues to load or to store vision data in and out of archives. The three types of vision objects have a common set of manipulation functions, these are:

- Open
- Copy
- New
- Delete
- Save

When the data of a vision object has been changed, a controller warning dialogue is presented. This provides the possibility to accept or discard the changes.

4.6.2 Vision file, general

■ Select 'General' (see Figure 22).

Configuration - Vision data - Package - General data <BGA,BGA>

General

Creator: Date:

Body dimension

Length: mm
Width: mm
Height: mm
Depth: mm

Body tolerance

Length: mm
Width: mm
Phi: deg

Uncertainty

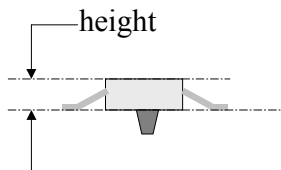
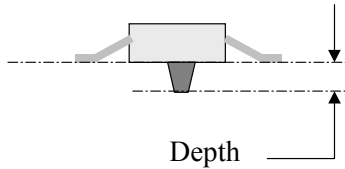
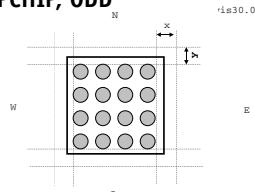
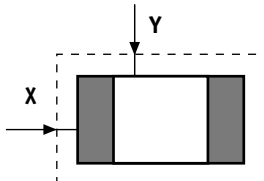
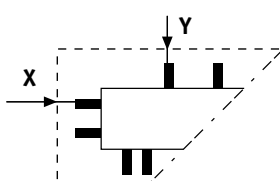
X: mm
Y: mm


✓ ? ✗

Figure 23 BGA, general (example)

- Fill in the correct parameters according the table below:

ACTION		DESCRIPTION	EXAMPLE
Body dimensions - Length - width X and Y dimension of the footprint of the component measured with respect to the zero orientation of the component.	BGA CSP FLIPCHIP	The circumscribing box of the outer bumps should be taken.	
	ODD	The body dimension as given in the [PACKAGE] description block should denote the dimensions of the component.	
	CHIP	Remark: For black components, X = body length, Y = lead width.	
	Misc		<div><div>PLCC</div></div> <div><div>QFP</div></div> <div><div>S0-S0J</div></div> <div><div>SOT</div></div> <div><div>SPECIAL</div></div>

ACTION	DESCRIPTION	EXAMPLE
- Height	Z-length measured with respect to the zero orientation of the component (board mounting surface) to the top of the circumscribing box of the component.	
- Depth	Z-length measured with respect to the zero orientation of the component (board mounting surface) to the bottom of the circumscribing box of the component. This is an optional value which is assumed to be 0 if not specified otherwise.	
Body tolerance - Length, width, phi	Absolute dimensions for the tolerance on the size of the component in X and Y direction.	Tip: This is usually 20% of the body size.
Uncertainly - X, Y Defines the maximum allowed deviation from the ideal pick position in X, Y and Phi direction. This number is also used to determine the search area.	<p>Advised Phi for reject level = 30 deg. Tip: Guideline LFOV: X=1.5 x Y=1.5 mm SFOV: X=3 x Y=3 mm. Tip: When component can be measured on both cameras default is X=3 x Y=3 mm. Tip: Depending on the dimension body and pitch lead. The larger the component dimension, the larger the reject level. The smaller the pitch of the pads of the component, the smaller the reject level.</p> <p>BGA, CSP, FLIPCHIP, ODD</p>  <p>CHIP</p>  <p>Miscellaneous</p> 	

- Press  .

4.6.3 Vision file, prepare

■ Select 'Prepare' (see Figure 22).

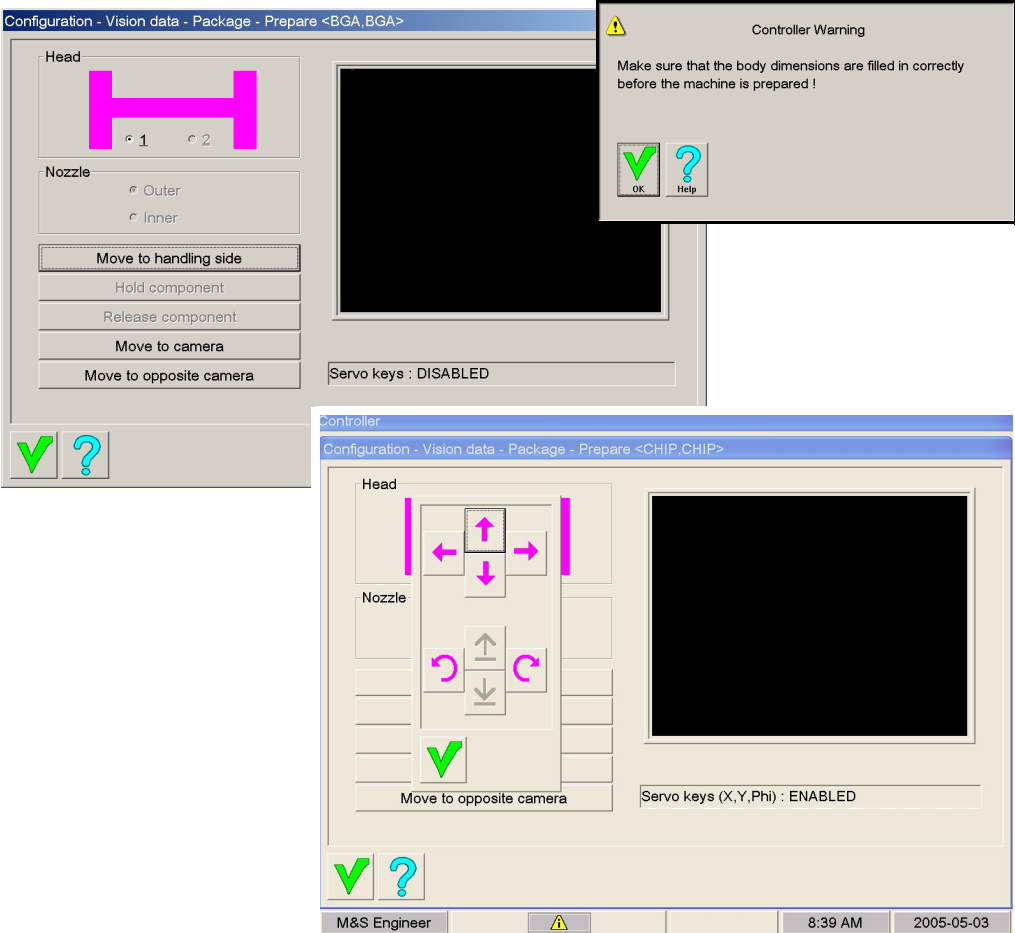


Figure 24 Vision file, prepare

ACTION	DESCRIPTION	EXAMPLE
Head	Selection head 1 or 2	
Nozzle	Selection outer or inner nozzle	
Move to handling side	Move the camera to the front for positioning component under nozzle	
Hold component	Position component	
Release component	Position component	
Move to camera	Position component above camera using the keys	
Move to opposite camera		

- Press  .

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4.6.4 Vision file, measure

Select 'measure,' to check if the component is recognized by the vision system.
If the component is not recognized, see [Figure 25](#).

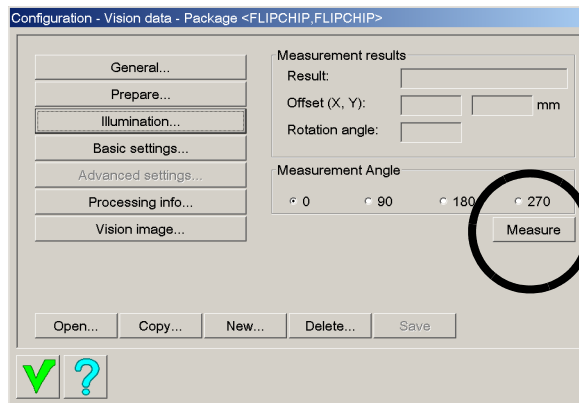


Figure 25 Vision file, measure

4.6.5 Vision file, illumination

- Select 'Illumination', see [Figure 26](#)

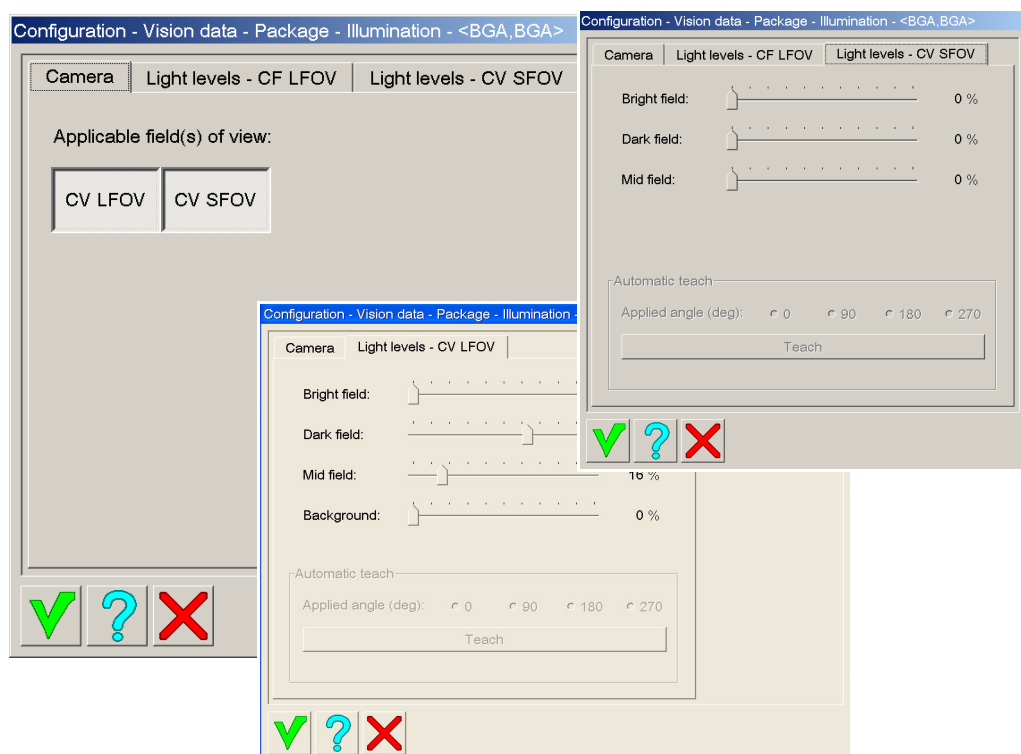



Figure 26 BGA, illumination

- Fill in the correct parameters according the table below

Illumination parameters	
Camera	Indicates which camera is used.

Illumination	Indicates illumination for LFOV (Large Field Of View) or SFOV (Small Field Of View) camera respectively. Choose from: For LFOV or SFOV camera: Dark field of view is used for bumped components. This beam of light creates a shadow and makes the bumps visible for the camera. Bright field of view is used for leaded components. This beam of light creates a reflection on the leads and makes the leads visible for the camera. Back light is used for odd components.
Light level	Defines the light level for the selected illumination type in percentage of maximum light level.
Automatic teach	-

Figure 27

- Press .

4.6.6 Vision file, basic settings

4.6.6.1 Basic settings, BGA, CSP

- Select 'Basic Settings' see [Figure 28](#).

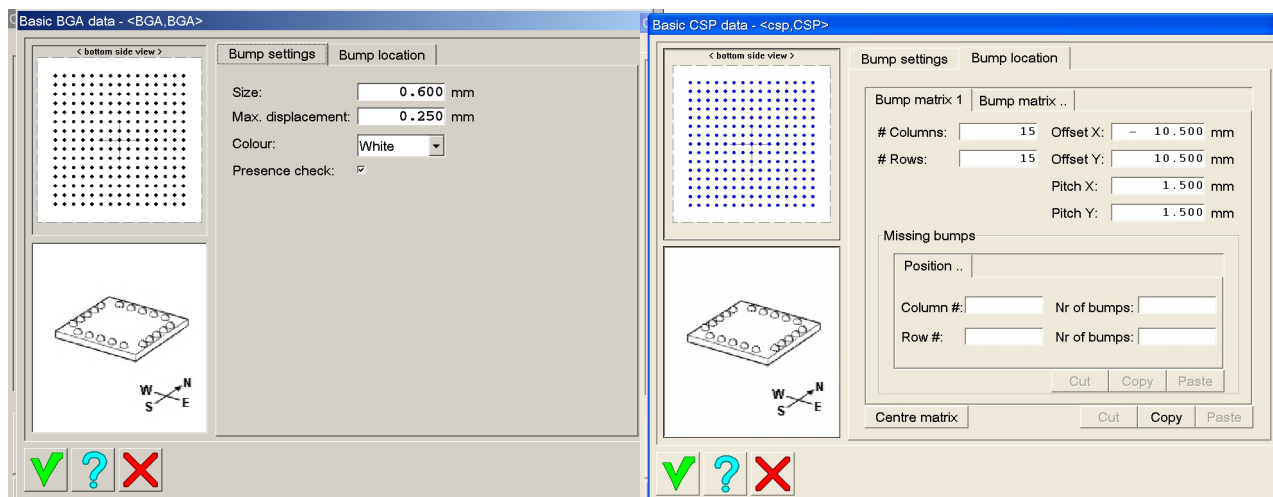


Figure 28 BGA, basic settings (example)

This function allows the user to specify all bump related data of the package type that is referred to in the screen header. The values are related to optical measurements of the package and need not be the same as the physical dimensions.

The graphic preview (upper left corner) of the package model shows the results of the parameters the user enters and/or changes. A graphical help component (lower left corner) is added to graphically assist the user in explaining what the meaning of a parameter is. Usually, there is a graphical help component per parameter.

- The following fields can be entered via a number of tabbed dialogues:

ACTION	DESCRIPTION	EXAMPLE
Bump settings	<p>Size Enter the size (diameter) of a bump.</p> <p>Max. displacement Maximum allowed distance for individual bumps from the alignment bump row. All bumps that are within this distance are accounted for during alignment.</p> <p>Colour Select the colour of the bumps.</p> <p>Presence check % of bumps that needs to be present.</p>	
Bump location\		
Bump matrix I	<p>Enter the bump matrices of the flipchip/BGA, i.e. enter the number of columns and rows for each matrix. The user can add, cut, copy and delete matrices. Each matrix is symmetric. For each matrix, the upper left corner must be specified (Offset X and Offset Y) as well as the distance in X and Y direction between the individual bumps. It is possible that not all bumps in the matrix are present. Bumps within a matrix are cleared by identifying them as missing. Important to know is that selected matrix is drawn in blue. The selected missing bump within the matrix is drawn in red.</p>	
Missing bumps	<p>Enter the row and column of the missing bumps</p>	

4.6.6.2 Basic settings, flipchip

- Select 'Basic settings,' (see Figure 22).

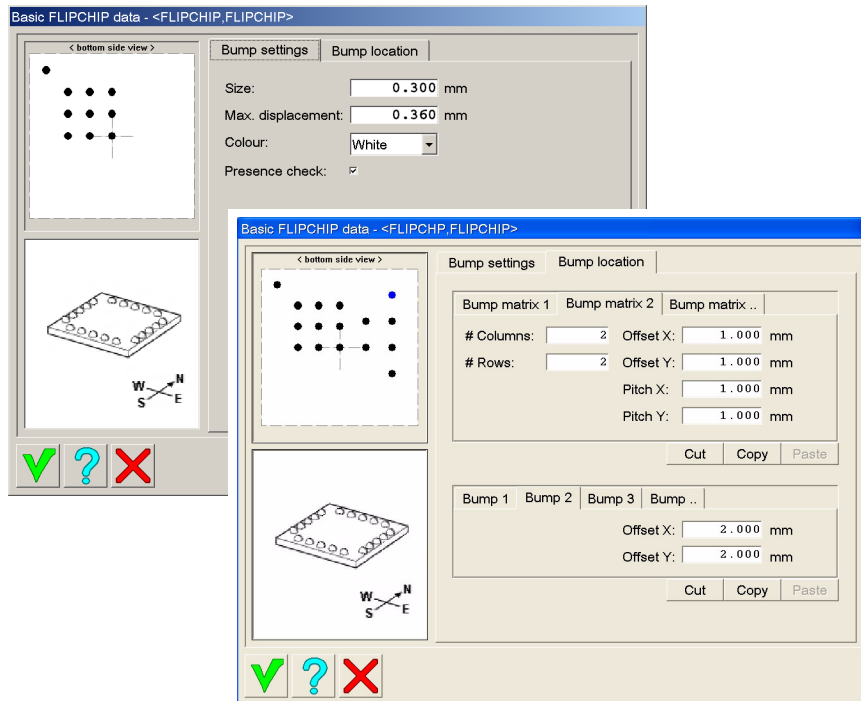


Figure 29 Flipchip, basic settings


This function allows the user to specify all bump related data of the package type that is referred to in the screen header. The values are related to optical measurements of the package and need not be the same as the physical dimensions.

The graphic preview (upper left corner) of the package model shows the results of the parameters the user enters and/or changes. A graphical help component (lower left corner) is added to graphically assist the user in explaining what the meaning of a parameter is. Usually, there is a graphical help component per parameter.

The following fields can be entered via a number of tabbed dialogues:

ACTION	DESCRIPTION	EXAMPLE
Bump settings	<p>Size Enter the size (diameter of a bump)</p> <p>Tolerance Enter the maximum allowed difference between the nominal and maximum/minimum allowed bump size.</p> <p>Max. Displacement Maximum allowed distance for individual bumps from the alignment bump row. All bumps that are within this distance are accounted for during alignment.</p> <p>Colour Select the colour of the bumps.</p> <p>Bump presence Enabled if 100% of the bumps must be checked on their presence.</p>	

ACTION	DESCRIPTION	EXAMPLE
Bump location	Enter the bump matrices of the flipchip, i.e. enter the number of columns and rows for each matrix. The user can add, cut, copy and delete matrices. Each matrix is symmetric. For each matrix, the upper left corner must be specified (Offset X and Offset Y) as well as the distance in X and Y direction between the individual bumps. Besides entering the matrices, individual bumps can be entered as well. Specify the location of each bump (Offset X and Offset Y). Bumps can be added, cut, copied and deleted. The user can mix matrices and individual bump definitions. Important to know is that selected matrix or bump is drawn in blue.	

■ Press  .

4.6.6.3 Basic settings, ODD

- Select 'Basic settings' (see Figure 22).

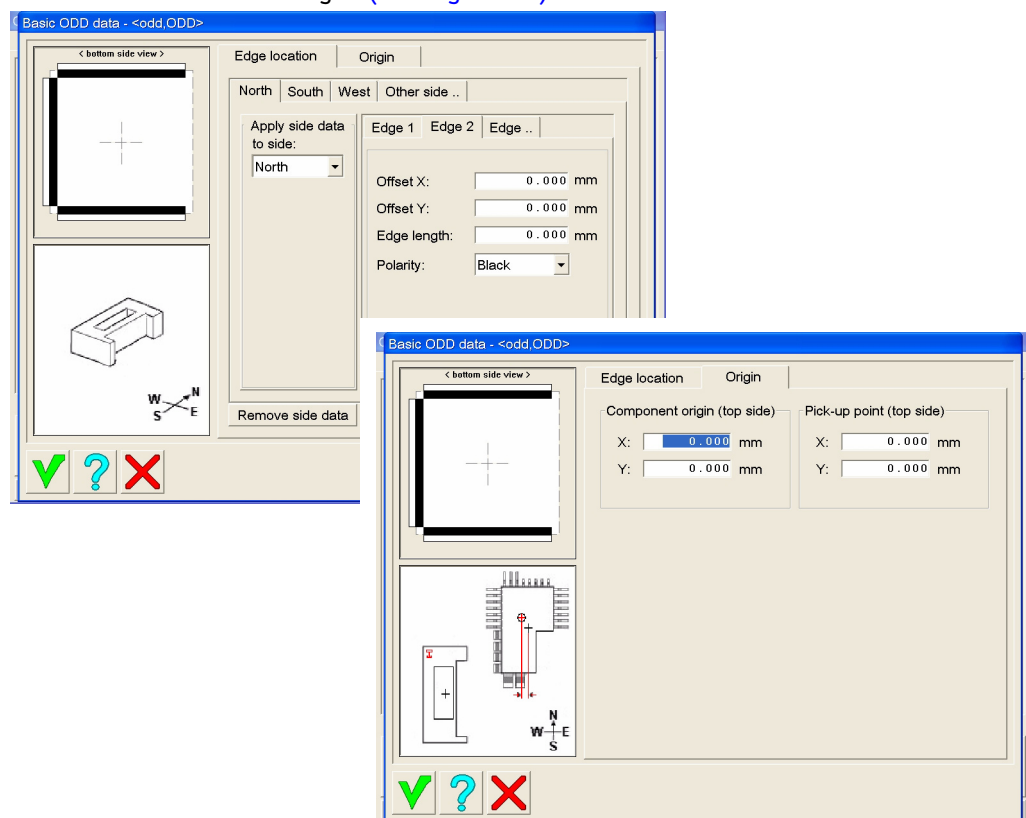


Figure 30 ODD, basic settings

This function allows the user to specify all ruler related data of the package type that is referred to in the screen header. The values are related to optical measurements of the package and need not be the same as the physical dimensions.

The graphic preview (upper left corner) of the package model shows the results of the parameters the user enters and/or changes. A graphical help component (lower

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left corner) is added to graphically assist the user in explaining what the meaning of a parameter is. Usually, there is a graphical help component per parameter.

The following fields can be entered via a number of tabbed dialogues:

Ruler Info:

Ruler information is configured per group. A number of groups can be configured per side. Sides east/west and north/south can be configured simultaneously. To be able to configure a group, choose a side (and an existing group) by selecting it. The user can change, add and remove groups. Groups can also be copied from one group and pasted into another group, also at different sides. Groups of the selected side can be removed rigorously by applying the Remove Side Data button. The Preset button can be used to pre-define a set of parameters of a ruler group. In other words, press the button and the software calculates a set of rulers that fit onto the selected side of the component. The Preset function is only useful in situations where there is only 1 group on the selected side and the groups are all on the outside edges of the component. The threshold value is not preset to any value, other than the default value. Change the threshold value manually or teach the threshold value.

ACTION	DESCRIPTION	EXAMPLE
Apply side data to side	Selection of the side for which the group information is going to be modified.	
Group n	Selection of the group for which the parameters need to be changed. All parameters below apply to this single group. If east/west or north/south side has been selected, the groups are configured as if they were for the east or the north sides. The groups apply for both sides!	
Offset X	Enter the X coordinate of the first ruler in the group. For north/south this is the ruler at the left most position in the group, for west/east the ruler at the center of the group.	
Offset Y	Enter the Y coordinate of the first ruler in the group. For north/south this is the ruler at the left most position in the group, for west/east the ruler at the center of the group.	
Number of rulers	Enter the number of rulers present in the group.	
Ruler pitch	Enter the distance between the centers of the rulers in the group.	
Ruler width	Enter the width of the ruler in the group.	
Ruler length	Enter the length of the ruler.	
Threshold	Enter the ruler threshold grey scale value needed for ruler detection.	
Origin		
Component origin	Usually the component origin does not deviate from the center of the component (cross hair). However, if needed the component origin can be defined elsewhere. Enter the location of the component origin (X and Y coordinate).	

ACTION	DESCRIPTION	EXAMPLE
Pick-up point	For most components, the pick-up point is identical to the center of gravity and/or center of the component. However, not all components can be pick-up at that position (due to e.g. the shape or a hole in the component at the pick-up point). The pick-up point allows the user to specify the location at which the component is pick-up. Enter the X and Y coordinates of the pick-up point.	



Figure 31 Preset function

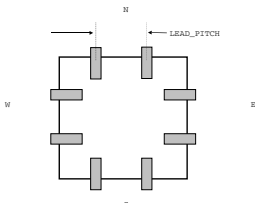
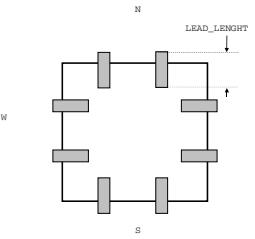
4.6.6.4 Basic settings, PLCC


- Select 'Basic data' (see Figure 22)

Figure 32 PLCC, basic data

- Fill in the correct values according to the table below.

ACTION	DESCRIPTION	EXAMPLE
Number of leads	Defines the number of leads in a specific lead group.	
Lead width	Defines the width of the leads in a lead group.	

ACTION	DESCRIPTION	EXAMPLE
Lead pitch	Defines the distance between the centres of two adjacent leads.	
Lead length	Defines the length of the leads in a lead group.	
Lead tolerance	If nb_of_leads is greater than 1, it represents the tolerance on the lead pitch, otherwise it represents the tolerance on the lead width.	Tip: This is usually 50% of the lead width.

■ Press .

4.6.6.5 Basic settings, QFP

- Select 'basic lead data' (see Figure 22),

Basic lead data - <QFP,QFP>

	North/South:	East/West:
Number of leads:	<input type="text" value="40"/>	<input type="text" value="40"/>
Lead width (mm):	<input type="text" value="0.300"/>	<input type="text" value="0.300"/>
Lead pitch (mm):	<input type="text" value="0.650"/>	<input type="text" value="0.650"/>
Lead length (mm):	<input type="text" value="0.800"/>	<input type="text" value="0.800"/>
Lead tolerance (mm):	<input type="text" value="0.150"/>	<input type="text" value="0.150"/>




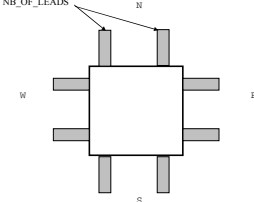
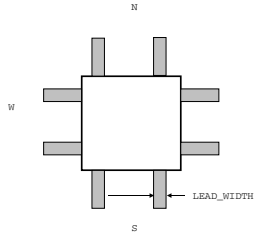
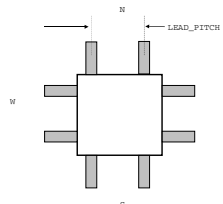
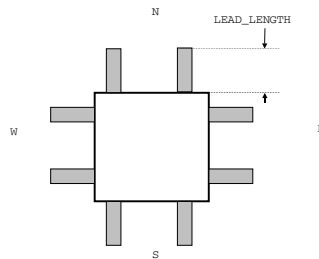



Figure 33 QFP, basic lead data

- Fill in the correct values according to the table below.

ACTION	DESCRIPTION	EXAMPLE
Number of leads	Defines the number of leads in a specific lead group.	

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ACTION	DESCRIPTION	EXAMPLE
Lead width	Defines the width of the leads in a lead group.	
Lead pitch	Defines the distance between the centres of two adjacent leads.	
Lead length	Defines the length of the leads in a lead group.	
Lead tolerance	If nb_of_leads is greater than 1, it represents the tolerance on the lead pitch, otherwise it represents the tolerance on the lead width.	<i>Tip: This is usually 50% of the lead width.</i>

- Press .

4.6.6.6 Basic settings, S0

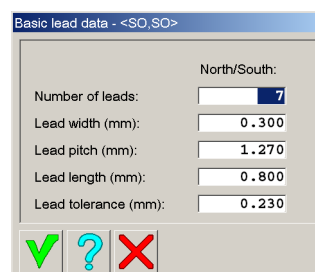
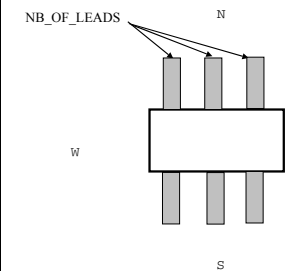
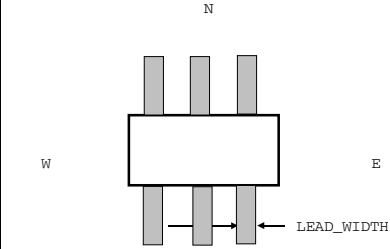
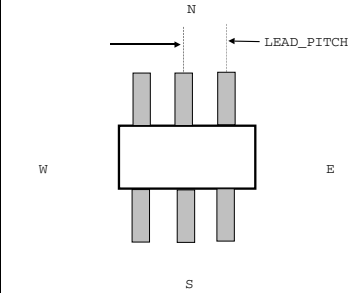
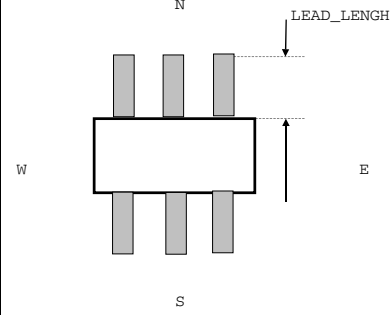



Figure 34 S0, basic data

- Fill in the correct values according to the table below.

ACTION	DESCRIPTION	EXAMPLE
Number of leads	Defines the number of leads in a specific lead group.	
Lead width	Defines the width of the leads in a lead group.	
Lead pitch	Defines the distance between the centres of two adjacent leads.	
Lead length	Defines the length of the leads in a lead group.	
Lead tolerance	If nb_of_leads is greater than 1, it represents the tolerance on the lead pitch, otherwise it represents the tolerance on the lead width.	<i>Tip: This is usually 50% of the lead width.</i>

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■ Press .

4.6.6.7 Basic settings, SOJ

Basic lead data - <SOJ,SOJ>

North/South:

Number of leads:

Lead width (mm):

Lead pitch (mm):

Lead length (mm):

Lead tolerance (mm):

☒ ☐ ☐

Figure 35 SOJ, basic lead info

4.6.6.8 Basic settings, SOT

Basic lead data - <SOT,SOT>

North: South:

Number of leads:

Lead width (mm):

Lead pitch (mm):

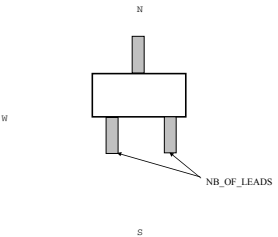
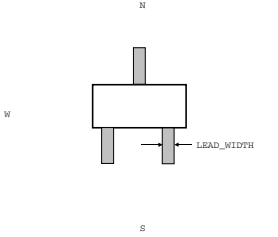
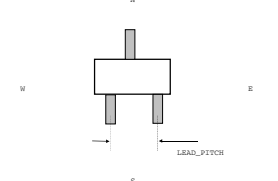
Lead length (mm):

Lead tolerance (mm):

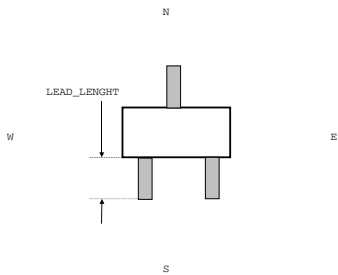
☒ ☐ ☐

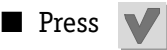
Figure 36 SOT, basic lead info

- Fill in the correct values according to the table below.

ACTION	DESCRIPTION	EXAMPLE
Number of leads	Defines the number of leads in a specific lead group.	
Lead width	Defines the width of the leads in a lead group.	
Lead pitch	Defines the distance between the centres of two adjacent leads.	

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ACTION	DESCRIPTION	EXAMPLE
Lead length	Defines the length of the leads in a lead group.	
Lead tolerance	If nb_of_leads is greater than 1, it represents the tolerance on the lead pitch, otherwise it represents the tolerance on the lead width.	Tip: This is usually 50% of the lead width.



4.6.6.9 Basic settings, special

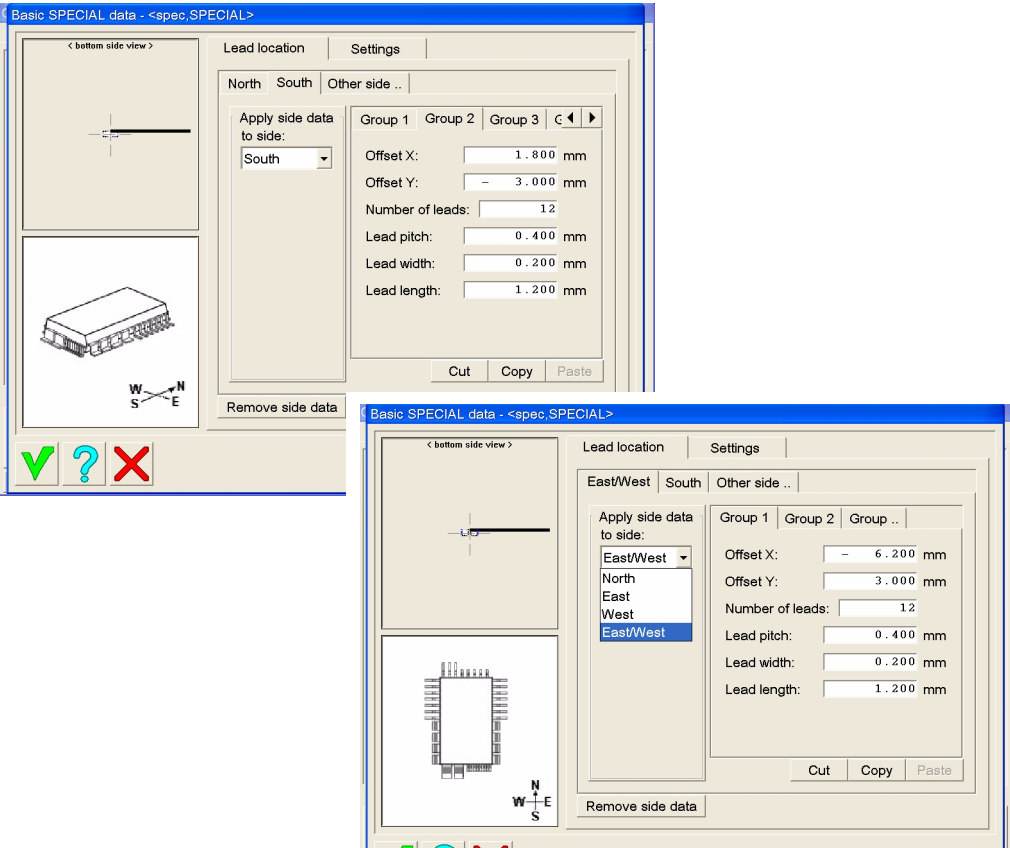


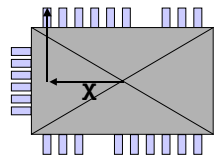
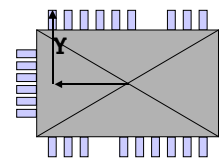
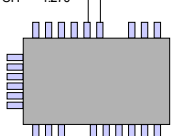
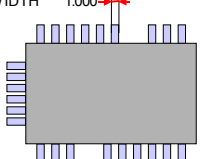
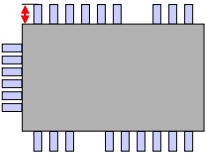
Figure 37 Special, basic special data


Lead info is configured per group. A number of groups can be configured per side. Sides west/east and north/south can be configured simultaneously.
To be able to configure a group, choose a side (and an existing group) by selecting it. The user can change, add and remove groups. Groups can also be copied from one

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group and pasted into another group, also at different sides. Groups of the selected side can be removed rigorously by applying the Remove Side Data button.

- Fill in the correct values according to the table below:

ACTION	DESCRIPTION	EXAMPLE
Side data to side.	Selection of the side for which the group information is going to be modified.	
Group n	Selection of the group for which the parameters need to be changed. All parameters below apply to this single group. If east/west or north/south side has been selected, the groups are configured as if they were for the east or the north sides. The groups apply for both sides!	
Offset X	Enter the X coordinate of the first lead in the group. For north/south this is the lead at the left most position in the group, for east/west the lead at the top of the group.	<p>GROUP_OFFSET -4.650 3.200</p> 
Offset Y	Enter the Y coordinate of the first lead in the group. For north/south this is the lead at the left most position in the group, for east/west the lead at the top of the group.	<p>GROUP_OFFSET -4.650 3.200</p> 
Number of leads	Enter the number of leads present in the group.	
Lead pitch	Enter the distance between the centers of the leads.	<p>LEAD_PITCH 1.270</p> 
Lead width	Enter the width of the lead in the group.	<p>LEAD_WIDTH 1.000</p> 
Lead length	Enter the length of the lead.	<p>LEAD_LENGTH 1.000</p> 

- Press .

4.6.6.10 Advanced settings, special

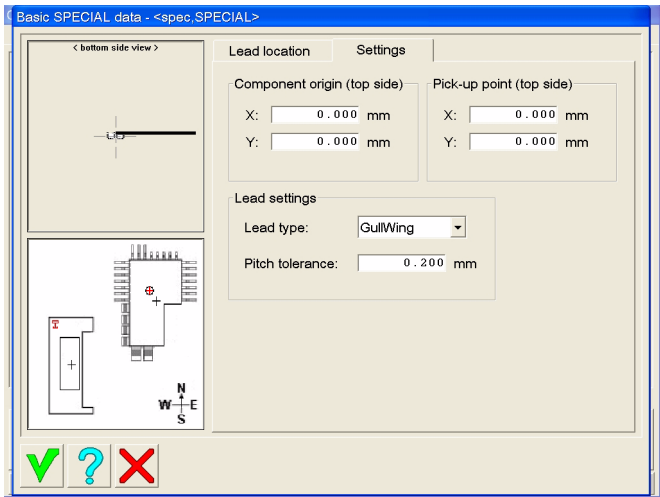




Figure 38 Advanced settings, special

- Fill in the correct values according to the table below:

ACTION	DESCRIPTION	EXAMPLE
Component origin	Usually the component origin does not deviate from the center of the component (cross hair). However, if needed the component origin can be defined elsewhere. Enter the location of the component origin (X and Y coordinate).	
Pick-up point	For most components, the pick-up point is identical to the center of the component. However, not all components can be picked up at that point	
Lead type	Choose between Gull wing (2) or J-lead (1)	

- Press .

4.6.7 Vision file, processing info


- Select 'Processing info', (see Figure 22).

Figure 39 Processing info (example)

Fill in the correct parameters according to the table below.

ACTION	DESCRIPTION	EXAMPLE
Maximum number of repicks	After <max_nb_of_repicks + 1> the ACM will generate an error to notify the operator.	Tip: Choose maximum number of repicks is 2 for 8 mm, 12 mm and 16 mm feeders. For all other feeding units it is 0. Tip: Low repick level for expensive components, higher repick level for inexpensive components.
Accuracy class	Defines the accuracy class that will be used during placement. This is an optional parameter.	When pitch (in mm) is > 0.8, 'low' When pitch (in mm) is 0.5 - 0.8, 'medium' When pitch (in mm) is ≤ 0.5, 'high'
Collision class	Defines the collision class that will be used during picking and placement. This is an optional parameter and affects the collision speed.	Tip: Default setting is 'normal', 'slow' can be used for flipchip placement with the outer nozzle.
Dump method	Defines if component should be dumped in waste basket or on a reject module.	

ACTION	DESCRIPTION	EXAMPLE
Placement Control	<p>Dwell Time: Defines the minimum time (in [ms]) during which placement force should be exerted on the component. Default value is 0.</p> <p>Placement Force: Defines the placement force in Newtons to be used for the Force Control Placement Mode. When using the outer nozzle this mode is activated. When using the inner nozzle the force is 1.5N.</p>	<p><i>Mostly used for flipchip components</i></p> <p><i>Tip: Default setting is 4 N. This is not applicable for the inner nozzle. When using the inner nozzle the force is 1.5N. Tip: Use a force > 14 N to snap components into the board.</i></p>
Throughhole placement	<p>Collision check: Can be switched on to execute an extra collision detection while the bottom part of the component is passing through the board.</p> <p>Apply force: 4 - 14 N</p>	<p>NOTE: Collision check only works for components with a depth of 1.7 mm or higher</p>
FLUXER DIP CONTROL	PARAMETERS NEED ONLY BE FILLED IN FOR FLIPCHIP COMPONENTS.	
Offsets	This pick-up position is defined in relation to the center of the package.	

- Press  .

4.6.8 Vision file, vision image

- Select 'Vision image' (see Figure 22).

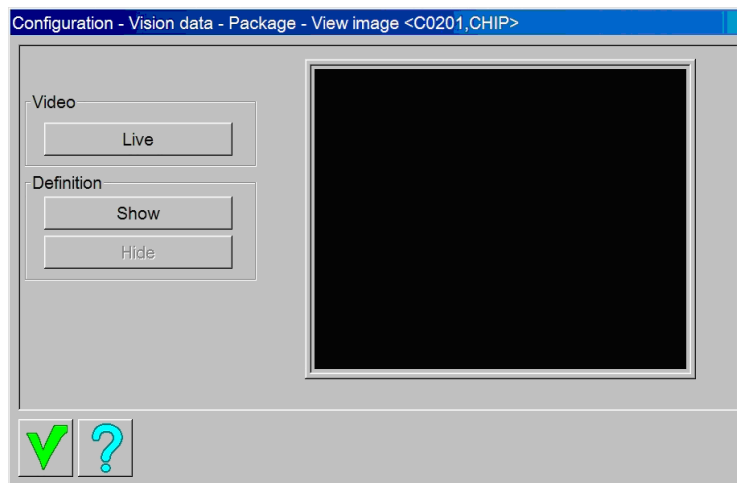




Figure 40 Vision image

- Choose buttons according to the table below:

BUTTON	DESCRIPTION
Video Live	A live image will be displayed in the vision window (see Figure 41). Dismiss the popup window by pressing  .
Definition Show	The components definition will be shown in the vision window.
Definition Hide	The components definition will not be shown in the vision window.

- After clicking on the button "Live" the following screen will appear. Click on "" to dismiss the controls. It is not applicable for the A-series vision tool.

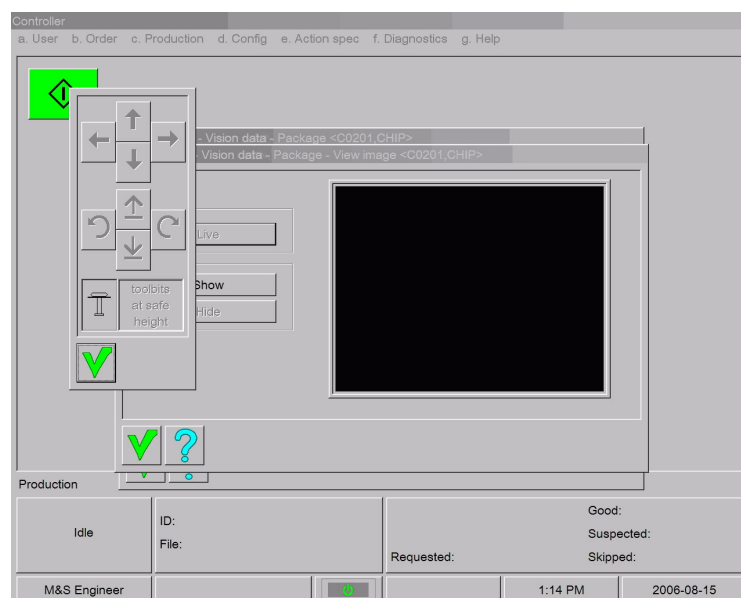


Figure 41 Live image

4.6.9 Vision data, restoring

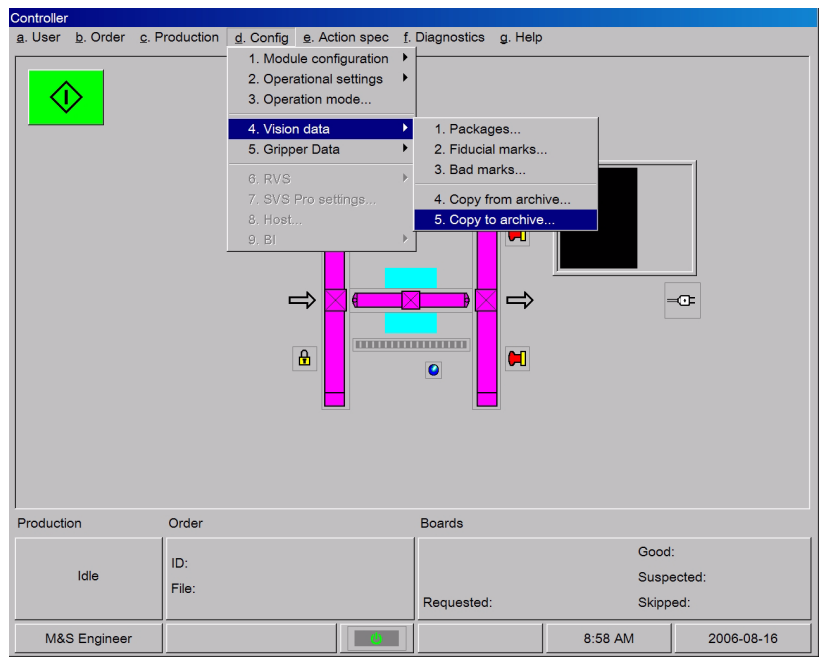


Figure 42

Selecting the menu option “Copy from archive” allows the user to copy vision files to the controller from an archive location either on the system, on a floppy or a network drive.

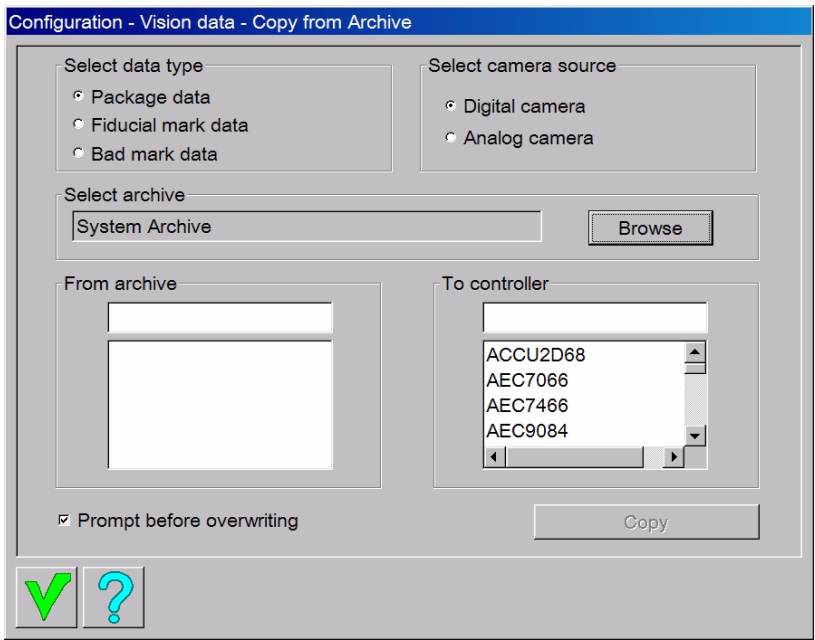


Figure 43

Vision AQ-2.fm

ACTION	DESCRIPTION	EXAMPLE
Select data type	Select type of vision files to copy	Choose 'Package data' to copy component files.
Select camera source	Digital or analog camera.	Select 'Digital camera'
Select archive	Where is the archive located?	Press 'Browse' to select archive location.
From archive	Select files to copy from archive.	Select single or multiple file(s) from the list to copy from archive. Wild cards can be used. Select '*' to copy all files from the archive. Press 'Copy' to start copying files.
Prompt before overwriting	User will be prompted before overwriting files with the same name if this option is checked.	

4.6.10 Vision data, archiving

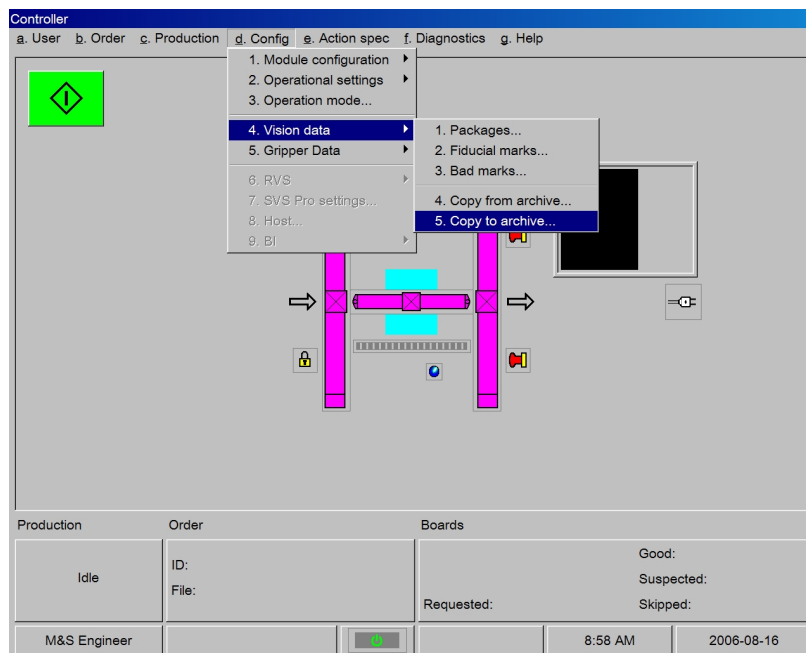


Figure 44

Selecting the menu option "Copy to archive" allows the user to copy vision files from the controller to an archive location either on the system, on a floppy or a network drive.

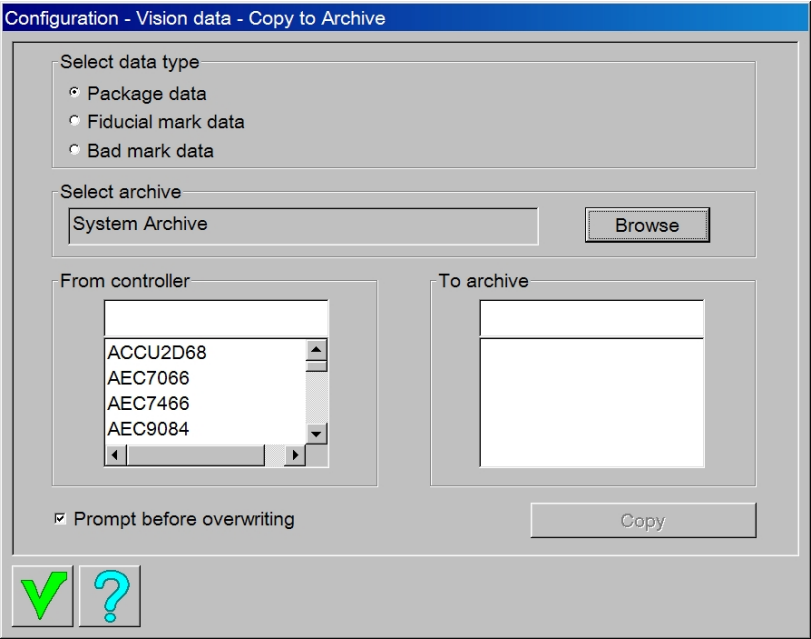


Figure 45

ACTION	DESCRIPTION	EXAMPLE
Select data type	Select type of vision files to copy	Choose 'Package data' to copy component files.
Select archive	Where is the archive located?	Press 'Browse' to select archive location.
From archive	Select files to copy to archive.	Select single or multiple file(s) from the list to copy to archive. Wild cards can be used. Select '*' to copy all files to the archive. Press 'Copy' to start copying files.
Prompt before overwriting	User will be prompted before overwriting files with the same name if this option is checked.	

CHAPTER 5 Trouble shooting

Problem Description	Possible Root Cause	Recovery Action
No lighting	No power on A-series vision tool	Check 24V power adaptor
	Firewire cable in wrong socket on Camera unit	Check Firewire cabling
	Firewire cable not connected / defect	Check Firewire cabling
	Software problem	Apply recovery disk. See CHAPTER 3 Software installation
No vacuum on nozzle	No compressed air	Check, compressed air presence; venturi valve; hoses
No vision image on screen	Firewire cable in wrong socket on Camera unit	Check Firewire cabling
	Firewire cable not connected / defect	Check Firewire cabling
	Software problem	Apply recovery disk. See CHAPTER 3 Software installation
Component dropped inside camera	Accidentally released vacuum from toolbit	Use blower to remove dropped component from inside camera unit and switch on vacuum
Toolbit dropped inside camera	Accidentally pushed toolbit release button	Take toolbit out of the camera and replace it
Toolbit doesn't release	No compressed air on toolbit release jaws	Check, compressed air presence; push button; valve; hoses
Component is not recognized	Wrong Z-level	Measure comp. height
	Vision parameters not correct	Check and edit vision parameters
Message "Illumination not possible" appears when opening a component file	Network settings configured for DHCP, but a DHCP server is (temporarily) not available on the network	<p>Check network settings and correct if necessary</p> <p>Check if connection to DHCP server is still available</p> <p>NOTE: If you are not able to restore the network connection for whatever reason; shut down the A-series vision tool software and restart it after 1 minute. Do not power off the hardware. You will now be able to use the A-series vision tool without a connection to the network.</p>

trouble shooting.fm

CHAPTER 6 Spare parts

The following parts have been defined as spare parts for the A-series Vision Tool.
Parts not listed in the table below are available on special request.

6.1 Spare parts, A-series vision tool

Item No.	Part of Item No.	Ordering Code	Description	Qty/ Mod	Priority indicator	Repair options	Replacement Instruction	Remarks
1		9498-396-01567	VENTURI	1			Y	
2		9498-396-01568	MECHANICAL VALVE	3			Y	
3		9498-396-01569	COMPONENT TOOL	1				
4		9498-396-01425	FIREWIRE CARD	1			Y	

Figure 46

6.1.1 Spare parts lists

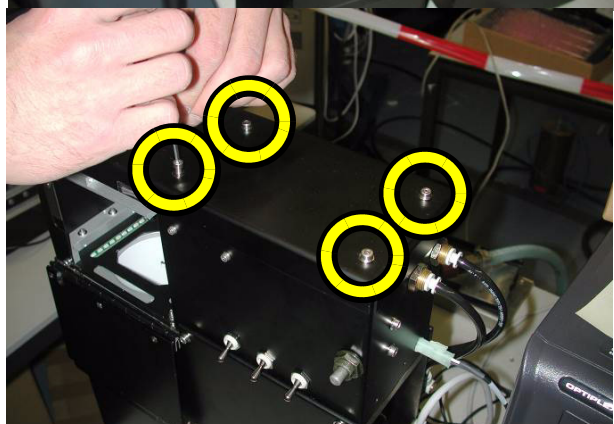
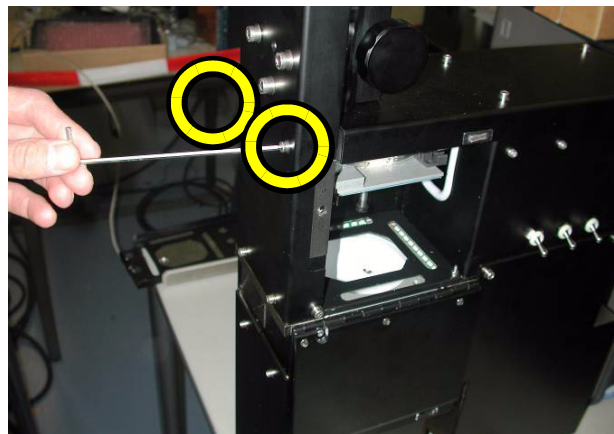
The fields in the spare parts list have the following meaning:

Item No	Position Identification.
Part of Item No	Module the part belongs to.
Ordering Code	the order code at Assembléon.
t.b.d. = To be defined. Code number not yet available.	
Description	Description of the article.
Qty/Mod	The quantity of the part in one module.
Priority Indicator	If 'Y', the part must be stocked regionally.
Replacement Instructions	If 'Y', a service instruction, maintenance or replacement instruction is available.
Remarks	1.Comment or specific information. 2.'Per Order Article', article with long lead-time. 3.Standard Packing Unit: Minimum packing quantity.

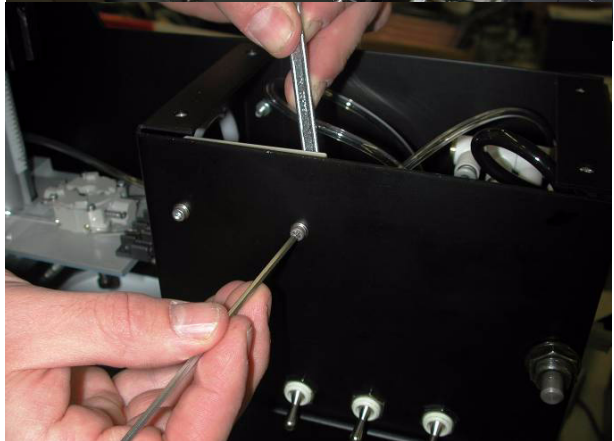
CHAPTER 7 Replacement instructions

1. Replacement instructions for Venturi valve

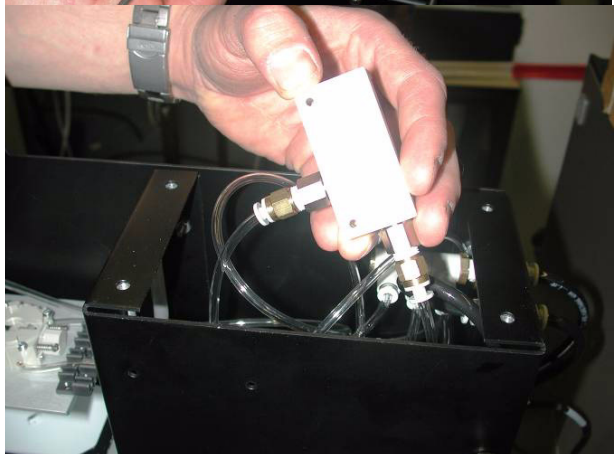
- Switch off the compressed air supply.
- Remove the 6 bolts holding the top cover (two on the side and four on the top).



- Lower the Z-adjust and remove the cover.
- Remove two bolts holding the Venturi on the front of the camera housing. Hold the nuts at the back when removing.



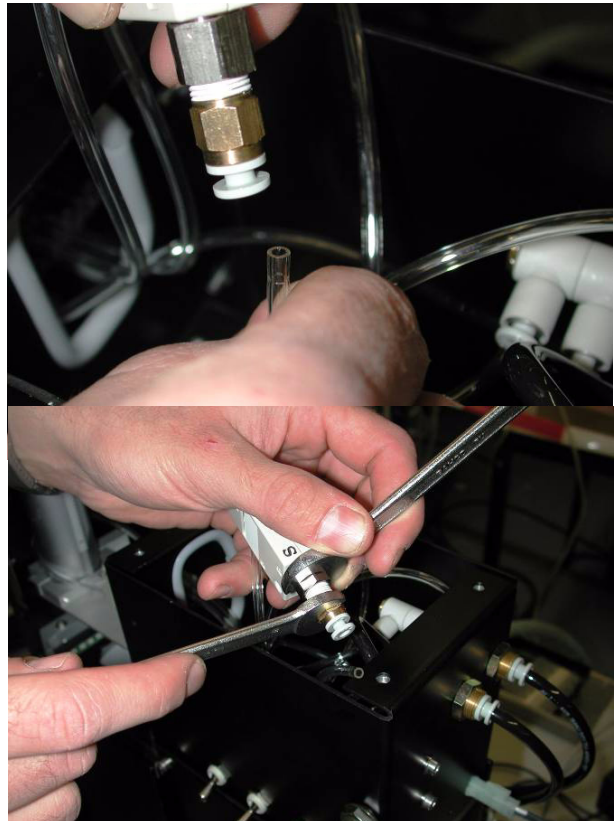
- Take out the Venturi.



Replacement.fm

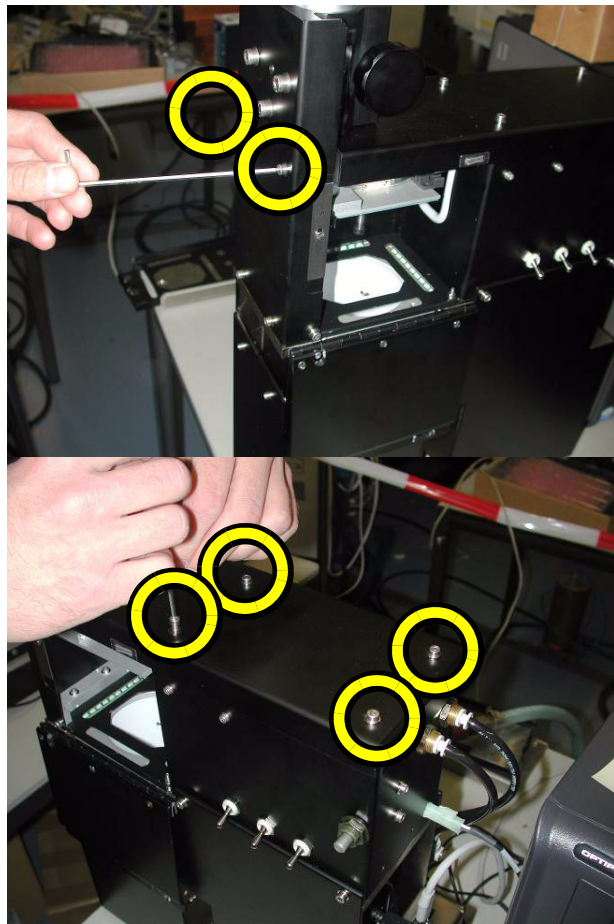
- Remove the air hoses.

- Remove the copper nuts (2x) from the Venturi.
- Replace Venturi and re-assemble in reverse order.

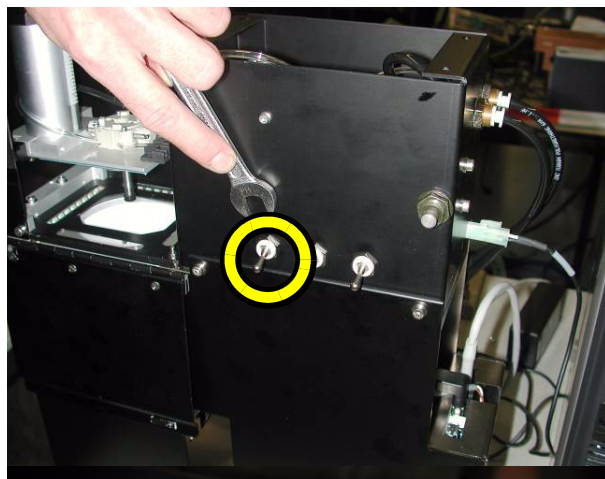


2. Replacement instructions for Mechanical valve

- Switch off the compressed air supply.
- Remove the 6 bolts holding the top cover (two on the side and four on the top).



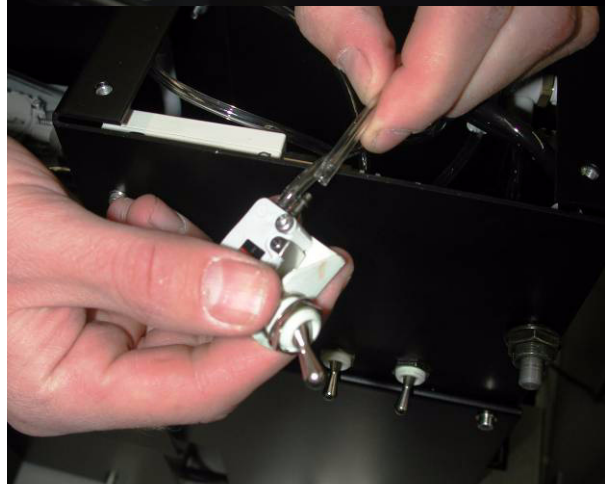
- Lower the Z-adjust and remove the cover.
- Remove nut on front of switch.



- Take out the switch and mechanical valve.



- Remove air hoses.
- Replace mechanical valve and re-assemble in the reverse order.

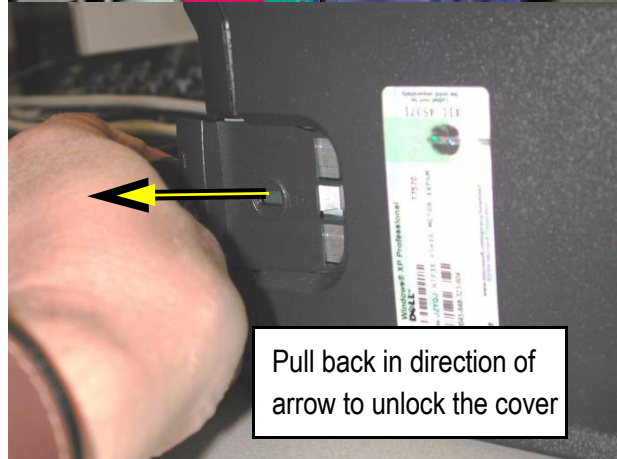


3. Replacement instructions for Firewire card

- Disconnect the power and firewire cable from the PC.



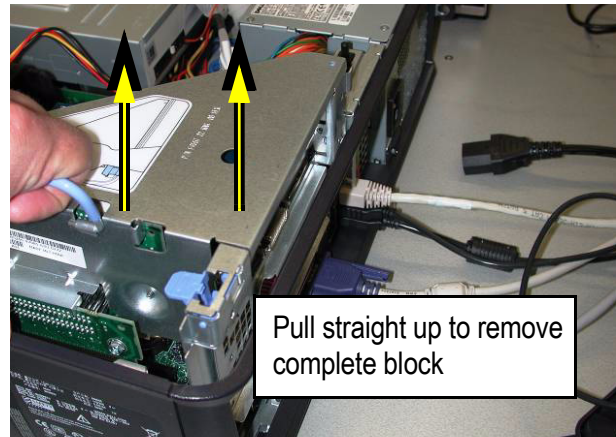
- Open the cover by sliding back the lock on the side of the PC.



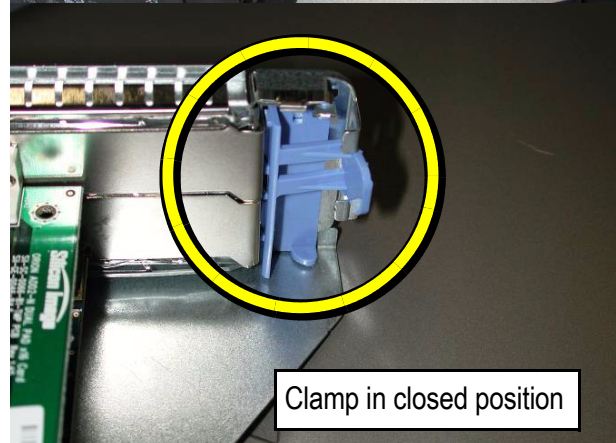
- Remove the cover and locate the blue handle inside of the PC.
- Tilt the blue handle upwards.



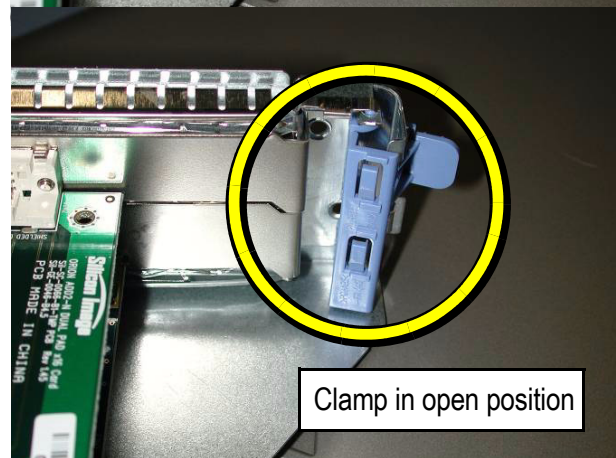
- Pull the blue handle upwards to remove the complete block containing the firewire card.



- Place the removed block on its side and locate the blue clamp holding the firewire card in position.



- Open the clamp to release the firewire card.



- Carefully remove the firewire card from the slot.
- Replace Firewire card and re-assemble in reverse order.

